

GRADUATION PROJECT

SVO PROJECT 9

FUTURE CLASSIC of the JAGUAR

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DATE	Spring 2018



© Picture: Patrick Erzen, Courtesy of RM Sotheby's, 2018

ABST RACT

The subject is a classic car of the future.

I want to show how driver's passion can continue in the future considering future technology and standards.

New possibility to drive on the race track and not to be scared about consequences.

How Jaguar heritage and design DNA will continue in the future.

Keywords: Jaguar, vehicle design, classic, future, drive

TIIVIS TELMÄ

Työ keskittyy tulevaisuuden klassikkoon.

Kuinka ajosta nauttivien intohimo tulee jatkumaan tulevaisuudessa huomioon ottaen tulevaisuuden teknologiaa ja vaatimuksia.

Mahdollisuus ajaa kilparadalla pelkäämättä pieniä kontakteja.

Miten Jaguarin perintö ja muotoilun DNA tulee jatkumaan tulevaisuudessa.

Avainsanat: Jaguar, ajoneuvomuotoilu, klassikko, tulevaisuus, ajaminen

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1. INTRODUCTION

1.1 WHY I HAVE CHOSEN THIS SUBJECT

I participated in Michelin Challenge in March 2018.

The subject was a vehicle which represents an important era, a defining time in the history of mobility and automotive design that addressed dramatic changes in mobility models, technologies and societal needs. Timeless, iconic, future classic, distinctive and groundbreaking vehicle of the year 2025 that becomes a classic at the year 2050. (michelinchallengedesign.com, 3.2018)

In this project, my subject changed a bit. I added new ideas, edited older ones and I went through the topic more deeply but the principle of the subject still stays the same.

1.2

OBJECTIVE

I want to learn more about the design language, future technology, Jaguar's heritage, what means classic and succeed in conveying to you the main idea of this project. Also in this project I have not taken co-operation with car or other industries that gives me unique opportunity to create with free hand and to do something what I love.

What is planning on?

A future classic with technology of the future.

A candy for the eyes, a candy for the whole body in the car and for enthusiasts candy for the whole soul.

For what is it used for?

For the racetracks, events and of course for everyday driving.

Why is the product planned?

For everyday driving, so that life can be more enjoyable.

To continue classics tradition.

For who is it planned for?

For people who enjoy driving.

For people who like to spend time on the racetrack.

How planning task has been implemented?

The materials and inspiration has mostly searched by the Internet, through google search, magazines, vehicles from the streets, vehicles from the events and Finnish nature. Along this project I did inquiry on the Facebook and interview.

What is the form of implementation?

1:5 clay model, 3D model scanned from a clay model, hand sketches and digital renders.



2. USE

2.1 FUTURE OF DRIVING

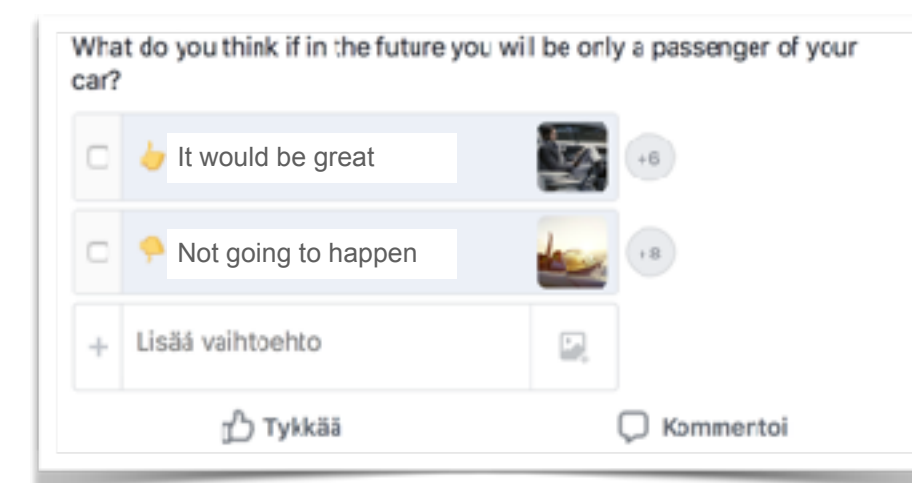
Future looks like to be full of autonomous vehicles. Especially the focus is on public transport. For vehicles, city areas will be only for the autonomous mode. On the open road, we will have a opportunity to switch to drive mode which will be a rare feature.

For this case, I did research on the facebook. I asked, what people think about full autonomous future without a possibility of driving yourself. (Pictures on the right)

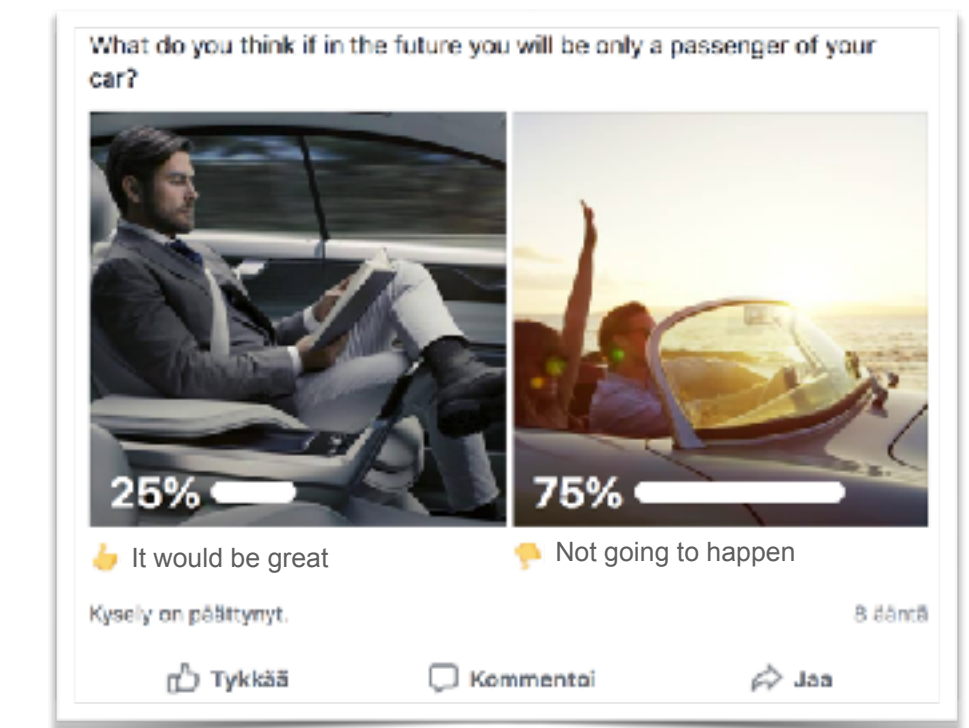
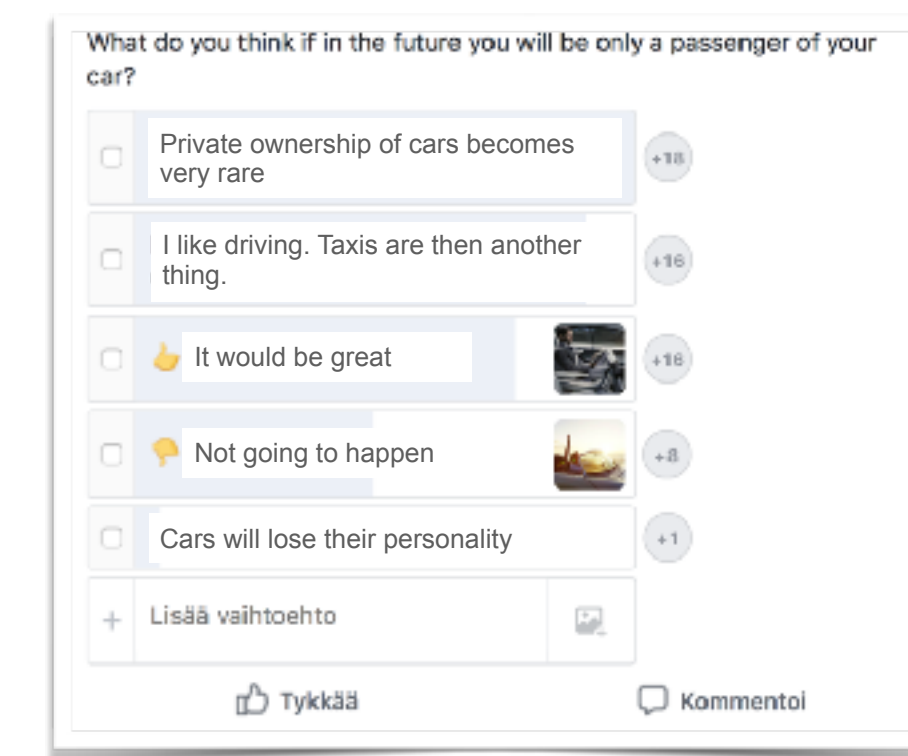
It seems to look like some people are interested in an autonomous cars, someone think that there will be less private ownership vehicles and there is still a lot of others who still think that fully autonomous will not going to happened. It is like that because in the future some of us still will want to get control in own hands and will want to get the enjoyment of being free and drive.

© Upper picture: Ivo Mikkulainen, 2018

© Lower pictures: facebook.com, 2018



RESEARCH ON THE FACEBOOK



2.2 USER

KAJ ERIK KYTÖNEN

20 years old, vehicle design student, race car driver.

He loves to drive and has a passion for racing. He owns Alfa Romeo 147 racing car and more cars are coming. A little interview for Kaj Erik Kytönen on the next page.

MYSELF

For this project, I chose this subject because I'm definitely one of this type of person who likes to drive. Autonomous is the main thing of the future and I also love that idea but in my opinion, driving will be staying beside that even if it will be only on the track.

This project's vehicle user is a car lover, car collector, driver, person who likes to take their own car for the ride.



© Picture: fullhdwall.com, 2018

A LITTLE INTERVIEW OF THE USER

Kaj Erik Kytönen, 20 years old, vehicle design student, race car driver.

What do you think about autonomous vehicles?

The idea of autonomous vehicles is interesting for the long journeys or for just boring trips. I would never trust automation to secure the driving because I like to drive on roads too. When I am driving on the open road, it is good time to clear my mind.

Do you like to drive?

For me driving is a relatively sacred thing that I would not want to give up. This might be because I have driven a race car for my whole life, so driving has already become a big part of my life.

What would you say, if in the future you can be only the passenger of your car?

If I would hear that self-driving would end, I would probably piss off and start to fight against.

What is your vision of the future driving?

I see that the current electric vehicles die relatively quickly, and the development of combustion engines is accelerated by new fuels and production techniques. Nature gas and ethanol sounds like the next logical alternative to replacing petrol and diesel fuel. I do not really think about electric vehicles will become more common because of the high technology's price, charging and technical aspects.

How much you drive?

At summer seasons I drive race car 1,000 - 4,000 kilometers, depending on seasonal equipment and competition opportunities. On the roads, it will be 15,000 - 20,000 kilometer per year.

Do you like to listen to an engine sounds from Youtube or TV?

Of course, sometimes I like to listen an engine sounds. Especially old classic race cars sound really nice.

What would you like, if in the future sports cars will have a game-like mode with sound effect and driving feel of old classics?

It would be a good idea. I would like to listen the sounds of the old Jaguar GTP or GT2 car and drive the hell of it. Sometimes it would be really fun to play with this system, but the silence of the electric vehicle is the thing that would be nice to enjoy after a long working day.

Are you interesting in getting classic/project/other cars?

At the moment, I have one Alfa Romeo 147 that has been built as a Touring Car. The idea is to complete the line with one S13 (PS13) Nissan Silvia which would mainly be a street-legal car but the stamp of race car would come sooner or later. One possibility would also be a replica of Opel Vectra B Super Touring car for the racing.

2.3 CLASSIC RACES

MONACO HISTORIC GP

Absolutely one of the greatest street circuit of the world with famous tight and twisty corners. This track is a huge challenge for the drivers where you need skills and a good amount of luck and on this track, you will see who is the real driver.



NURBURGRING OLD TIMER GRAND PRIX

This is one of largest and most popular classic car racing events in the world. Old timer Grand Prix, a crowd of over 60,000 people on incredibly and legendary circuit.



SPA CLASSIC

Belgium's wild and magnificent race track. Is one of the most popular circuits. With long, wild bends, sweeping curves and the rises and falls. It is one of the greatest places to drive fast cars and that why drivers love it and fear it.



GOODWOOD REVIVAL

Real old time event, no modern vehicles only classics and even the fish and chips are wrapped in 1950's newspapers.



GOODWOOD FESTIVAL OF SPEED

This is one of the largest and most diverse classic motorsport events in the world. Place where greatest cars and famous drivers are side-by-side from around the world.



CIRCUIT DES REMPARTS D'ANGOULÉME

The course itself is very demanding. The weekend-long event sees classic cars hurtling around the ancient, twisting roads of this pretty French hill-top town. It is one of the very few motor races to take place within the walls of a town, nothing has changed since the first race at the year 1939.



MILLE MIGLIA

Legendary 1000 miles race with over 350 drivers and stunning classic cars. Drivers competing from Brescia to Rome and back, passing through some of the most beautiful cities of Italy.



LE MANS CLASSIC

One of the most iconic races of all time with the legendary running start. Nowhere is there such a large gathering of classic cars and enthusiasts that at the biennial Le Mans Classic.



SILVERSTONE CLASSIC

One of biggest classic car events in the world with a lot of historic racing cars like Formula One, Sports cars, GT cars and Touring cars with a lot of races and demonstrations.



ZANDVOORT HISTORIC GRAND PRIX

Zandvoort historic Grand Prix is a young event but huge Historic Formula One, Pre-War Sport Car and legendary drivers help it to grow it into major historic racing events.



SPA SIX HOURS RACE

The genteel town of Spa, at the heart of the Ardennes, famous in Roman times for its mineral springs and healing waters, has given its name to health resorts everywhere.



© Nurburgring picture of the previous page: www.nuerburgring.de, 2018

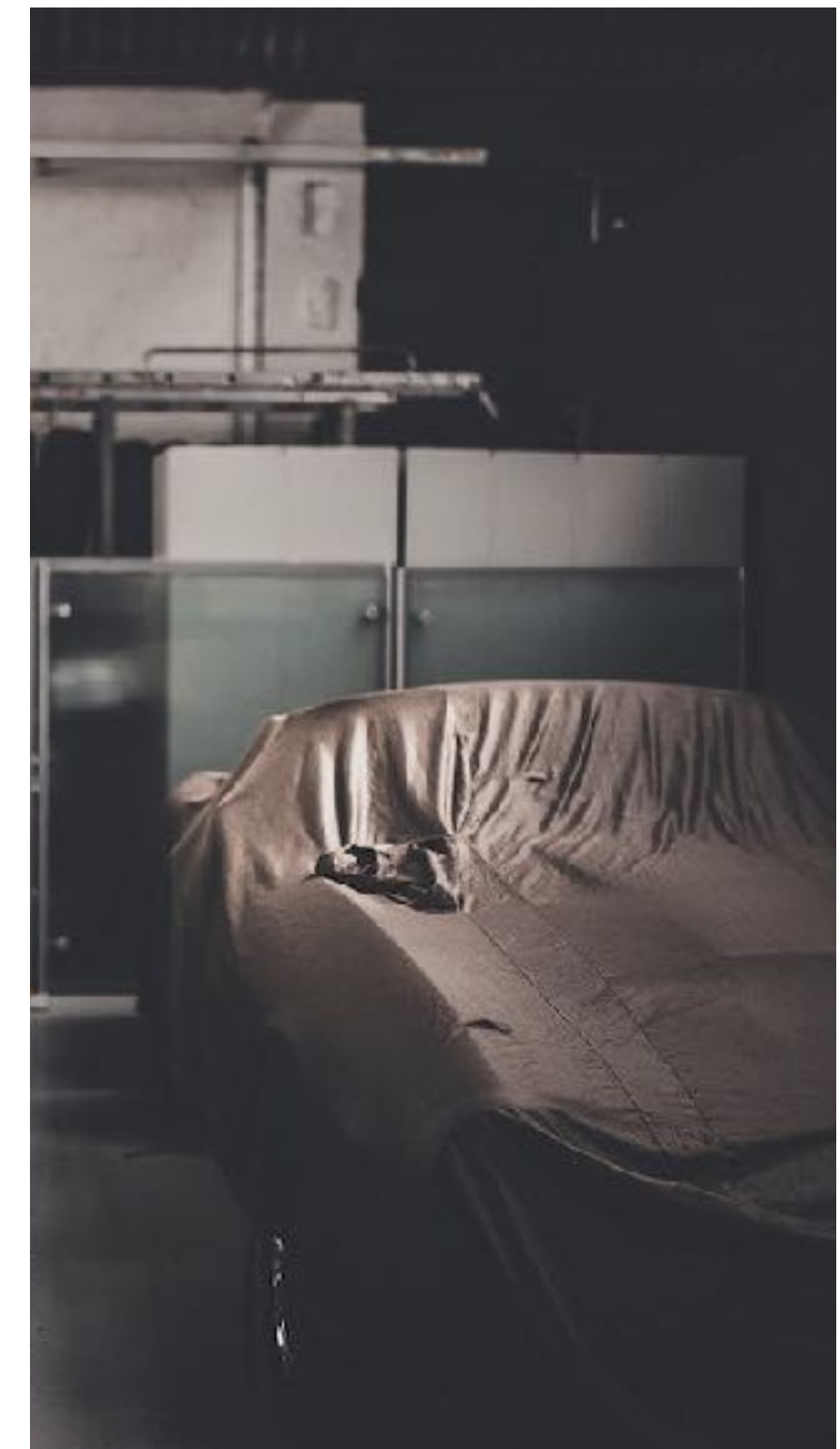
© All others Classic races pictures: Grandstand Motor Sport Ltd, 2018

2.4 CLASSIC CAR OWNER PROBLEMS



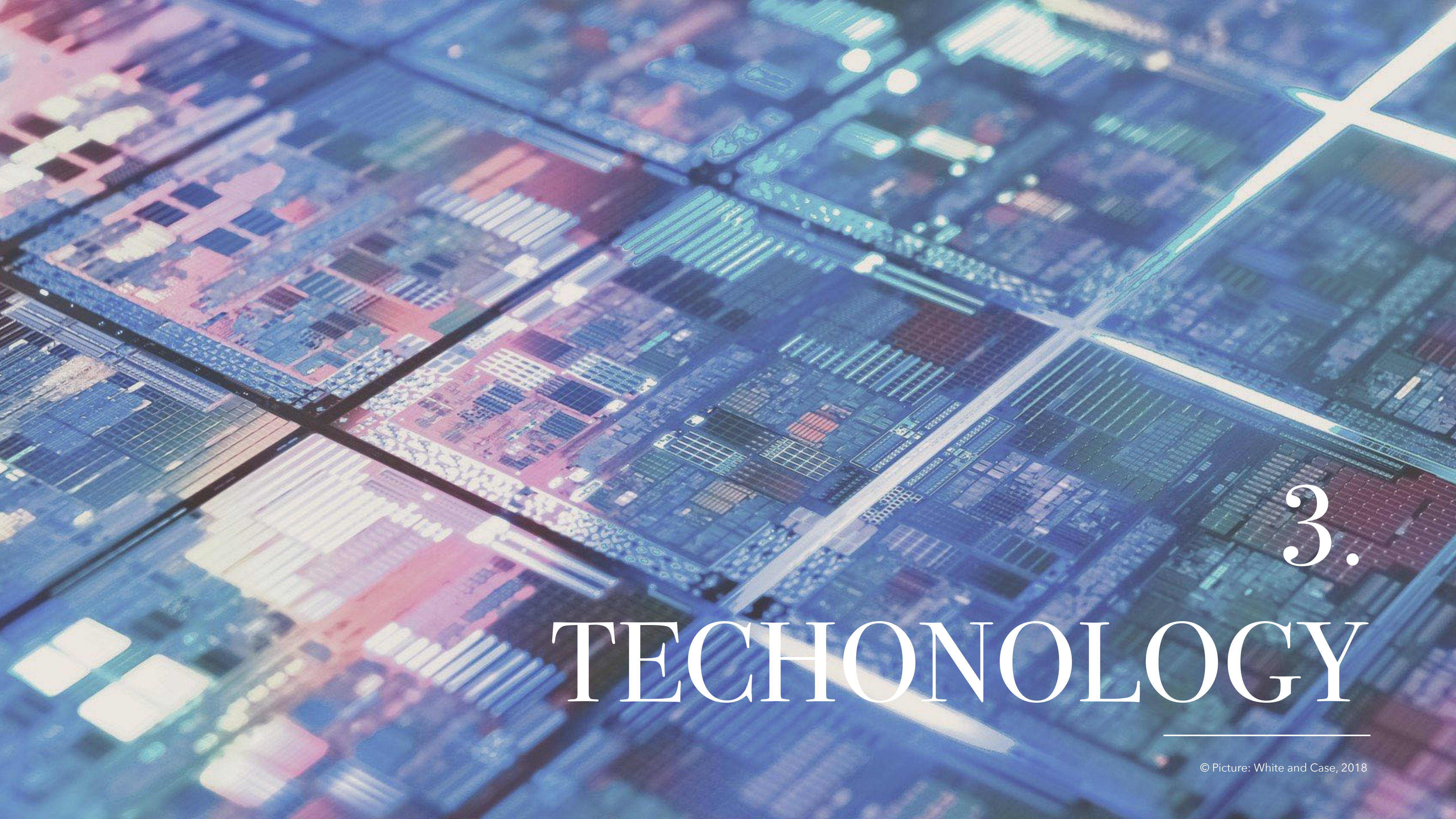
SOMEONE LIKE TO TAKE THEIR CLASSIC CARS TO THE ROAD BUT IT MAY HAVE COST A LOT OF MONEY AND TIME

© Picture: autoevolution.com, 2018



CLASSIC CAR OWNERS HIDE THEIR CARS IN THE GARAGE

© Picture: petrolicious.com, 2018

An aerial photograph of a city grid, overlaid with a digital, pixelated pattern in shades of blue, purple, and pink. The pattern resembles a data visualization or a digital map, with various rectangular blocks and lines. The overall aesthetic is futuristic and technological.

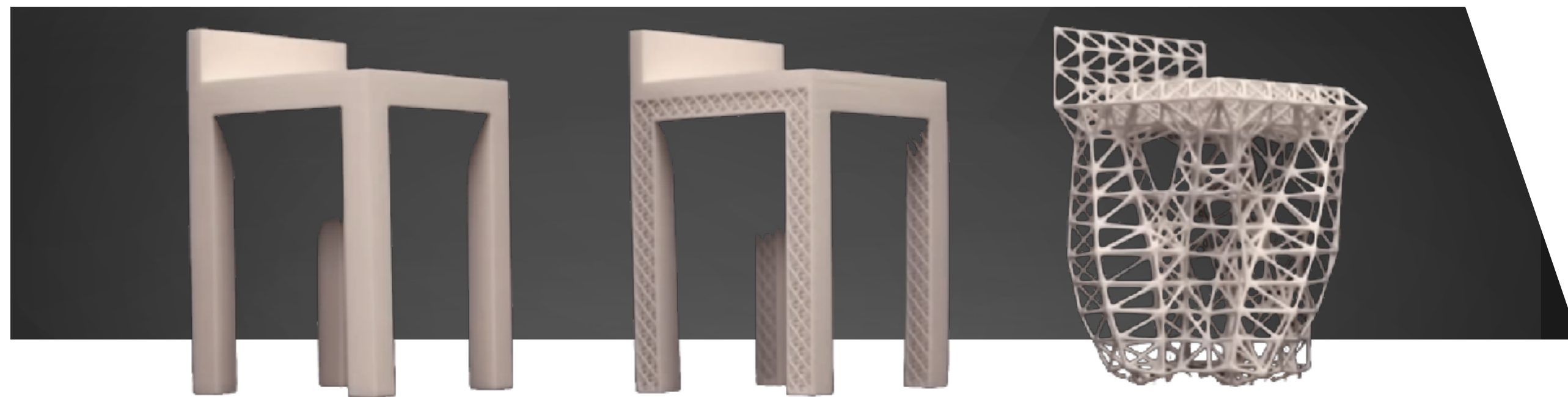
3. TECHNOLOGY

3.1 DESIGN LIKE MOTHER NATURE

Designing like Mother Nature means that with the 3D technique we can build layer by layer adding material, not to remove or cut down. Design and build for performance with 3D printing evolved lattice. The evolved lattice body structure is 3.5 times lighter and also a lot stronger than solid bars.

With 3D printing, it is possible to print a lot of different materials like an aluminium or even a human skin and in the future 3D printing will be 100x faster than now.

A big company like BMW is already started to 3D print some body parts and investing in a new big 3D printing facility.



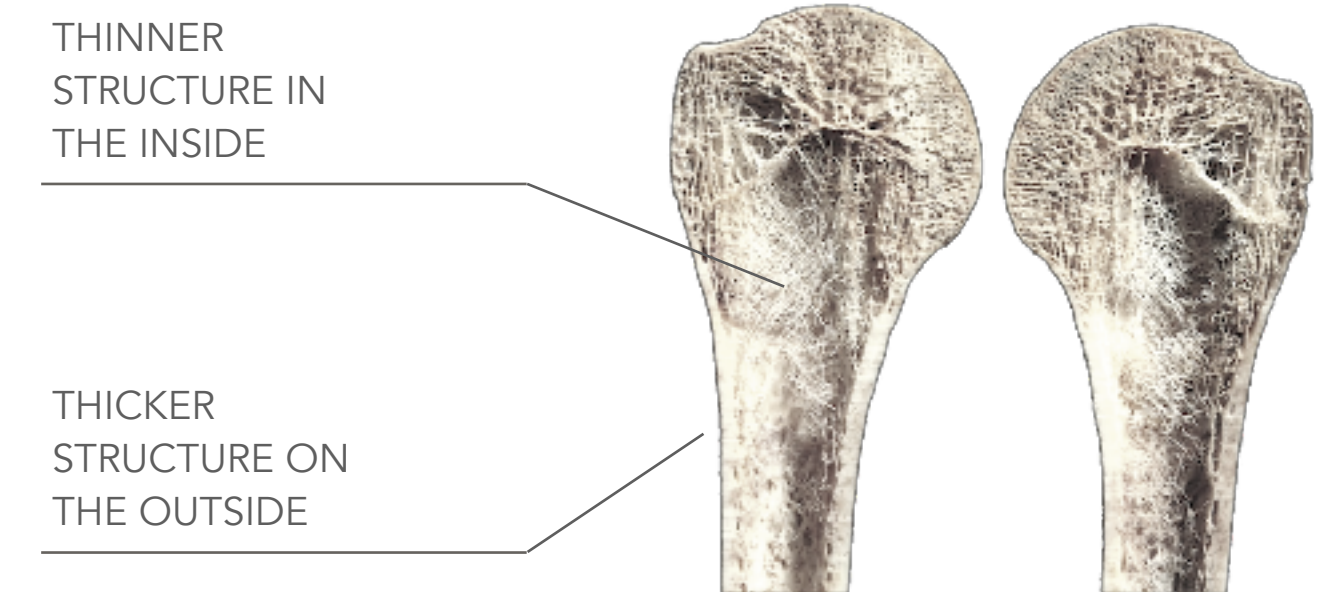
SOLID BARS
Traditional design
10,3 kilograms

UNIFORM LATTICE
Evolutionary design
4,1 kilograms

EVOLVED LATTICE
Smart design
2,9 kilograms



Tree structure



Bone structure

© Upper picture: OnlyGFX.com, 2018

© Lower picture: Tommaso Ghidini, Ted Talks, Youtube, 2018

© Picture on the left: Carl Bass, O'Reilly, Youtube, 2018

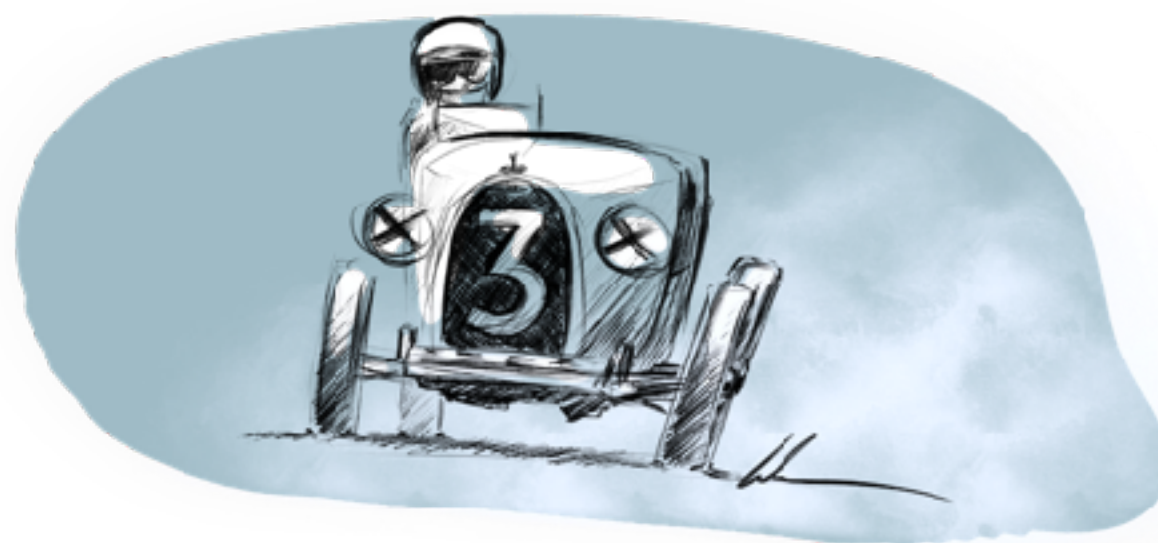
3.2 REPAIRING OF 3D STRUCTURE

Imagine if you could take your car to the track and drive the hell of it like on the real race. After small contacts you bring your car to the 3D printer and printer will fix your car, print new tires and you will be ready to drive again in no time.

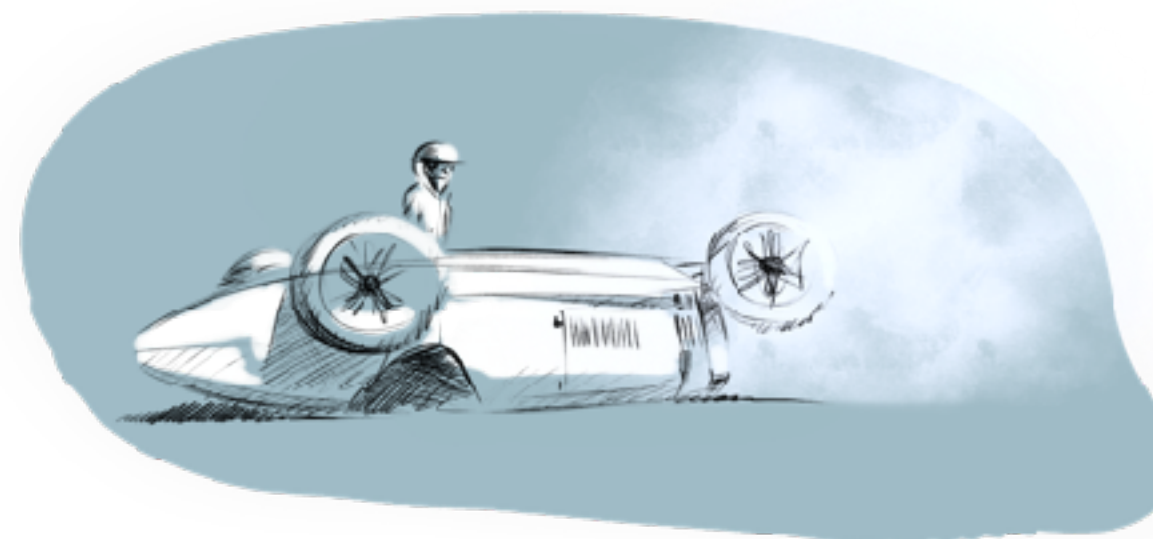
This is the main idea where I concentrate and why I so interested of this project is a new technology of repairing of the 3D structure after damages of a races and others small contacts and also for tire reproduce.

A have research of this type technology and it is so new that it was really hard to get right and believable information but when we look on this from another perspective it looks like basic 3D printing a couple of decades before. Maybe it sounds crazy for now but will be a basic thing in the future.

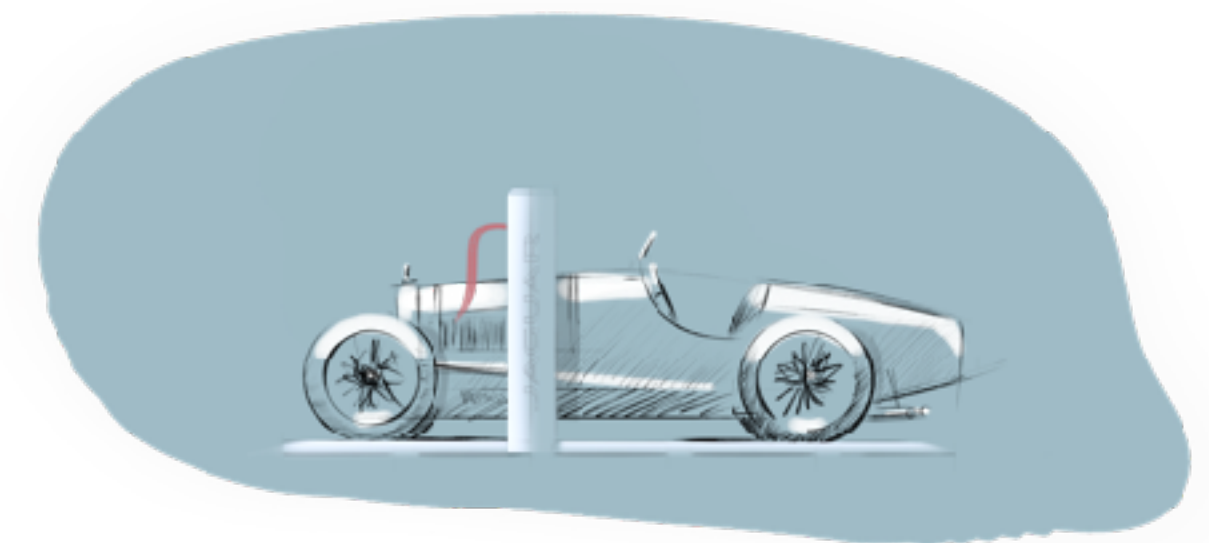
ON THE RACE TRACK



DRIVE LIKE MANIAC



DO NOT WORRY ABOUT SMALL CONTACTS



3D PRINTER WILL REPAIR 3D STRUCTURES

3.3 MATERIALS

"Aluminium delivers huge benefits in terms of reducing weight and recycling, which helps create cars that are lighter, more responsive and more environmentally friendly," - Wayne Burgess from Jaguar.

It is rust free, lightweight, tears more easily than steel, can always reuse. With 3D printer, shapes of the car will be easy to manufacture and will look astonishing and perfect.

I do not focus too much on the other materials at this project. Basically, environment-friendly and high-quality materials. I do believe that in the future everyone concentrates on environment-friendly materials.



3.4 IN-WHEEL MOTOR

WHAT ARE IN-WHEEL MOTOR

In-wheel motors are next-generation drive technology. That places motors in vehicle wheels.

ADVANTAGES OF IN-WHEEL MOTORS

This technology improves vehicle safety, environmental impact and driving comfort.

- Safety: Improved maneuverability
- Environment: Reduced energy consumption
- Comfort: Increased vehicle cabin space

ISSUES FACED BY IN-WHEEL MOTORS

A great deal of motor miniaturization research is taking place, but motors with sufficient drive performance have been too large and commercialization has yet to be achieved.

- Sufficient drive performance: Providing both torque and maximum driving speed
- Current motors too large

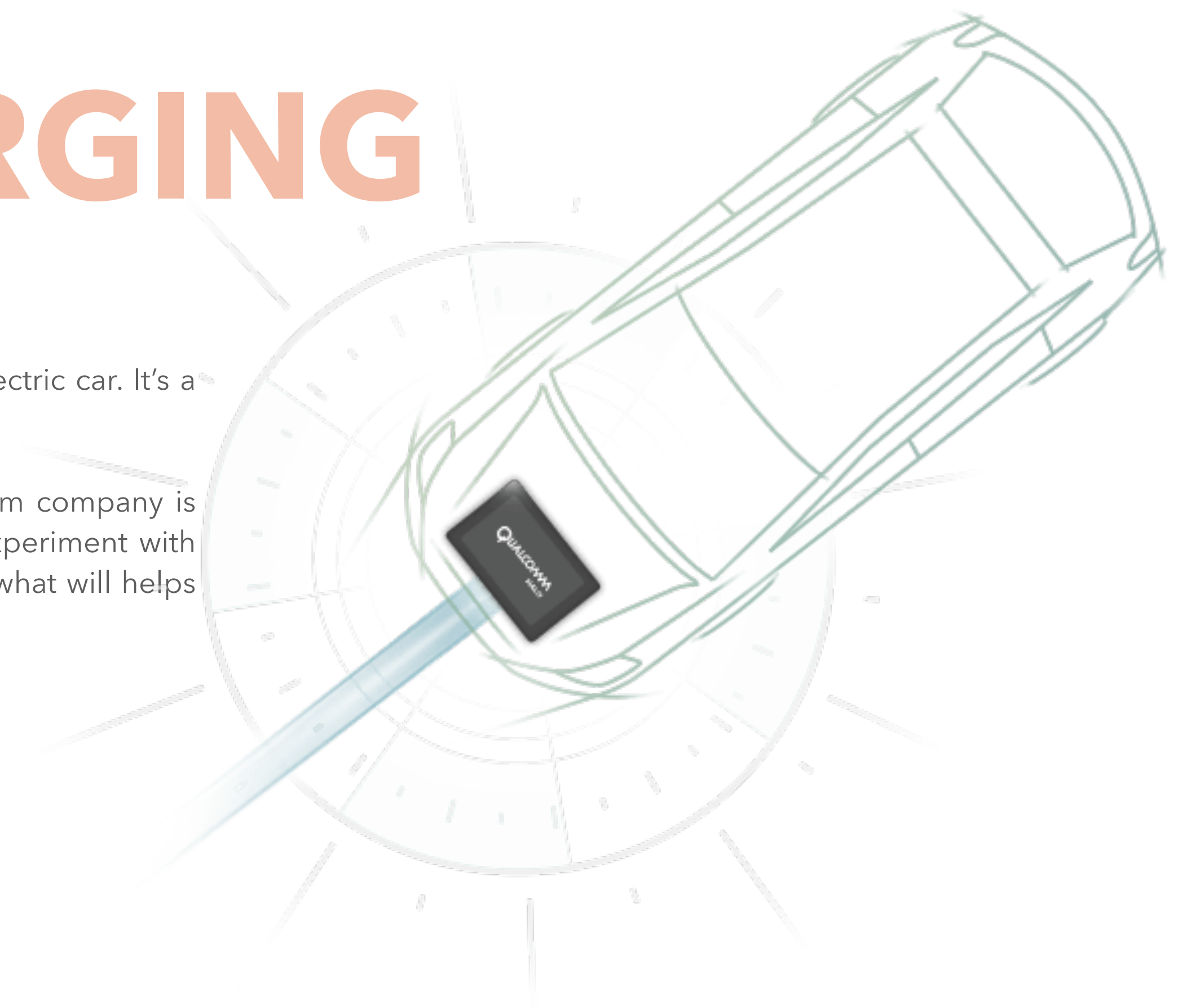


3.5 BATTERY AND INDUCTIVE CHARGING

"Any parking spot fitted with Qualcomm Halo™ technology is a place to recharge your electric car. It's a simple, elegant way to power up, cable-free." - Qualcomm Halo

The battery will be easy to charge with wireless parking chargers. For example, Qualcomm company is already invented inductive charging. And there is also inductive charging roads on the experiment with companies like Qualcomm and Electron. So this technique will be on the race tracks also, what will helps electric cars to drive larger distance.

The Battery will be also easy to remove.



3.6 AR EXPERIENCE

Augmented reality (AR). Like a game simulator. Easy to see information and navigation on the windscreen, select car which you like and have crazy experience on the famous race circuits.

Jaguar is already working on the windscreen display. In this project, I'm also using it but I added more cool features.

Windshield with 3D depth display, real-life sound effect and vibration feedback system you have astonishing opportunity to drive old classics like D-type and XJ13. Because why not?! If you love racing engine noise and you hear it on tv or youtube, do you still love it?

© Upper picture: Thefuturetech.com, 2018

© Center picture: JaguarHeritage.com, 2018

© Lower picture: Engadget.com, 2018



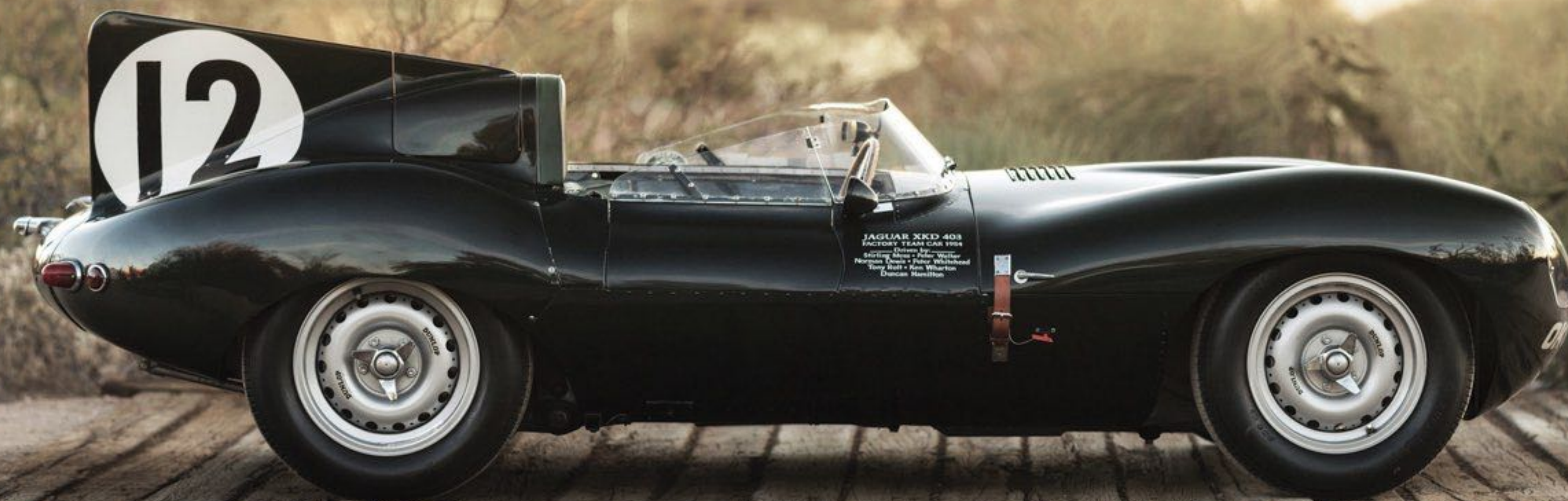
LOOKS LIKE RACING SIMULATOR



CHOOSE YOUR FAVORITE CLASSIC



FEEL THE PASSION OF THE OLD CLASSICS



4.

JAGUAR

4.1 THE HISTORY OF JAGUAR

1922 The Swallow Sidecar Company founded by William Lyons and William Walmsley.

1935 First car model SS 2½-litre sports saloon.

1945 The company's name changed to Jaguar.

1951 Jaguar's first Le Mans win. Its fifth and most recent was in 1990.

1961 Jaguar build the legendary E-type.

1992 The XJ220 become the world's fastest car.

2000 For four years Jaguar competed in F1, but with little success.

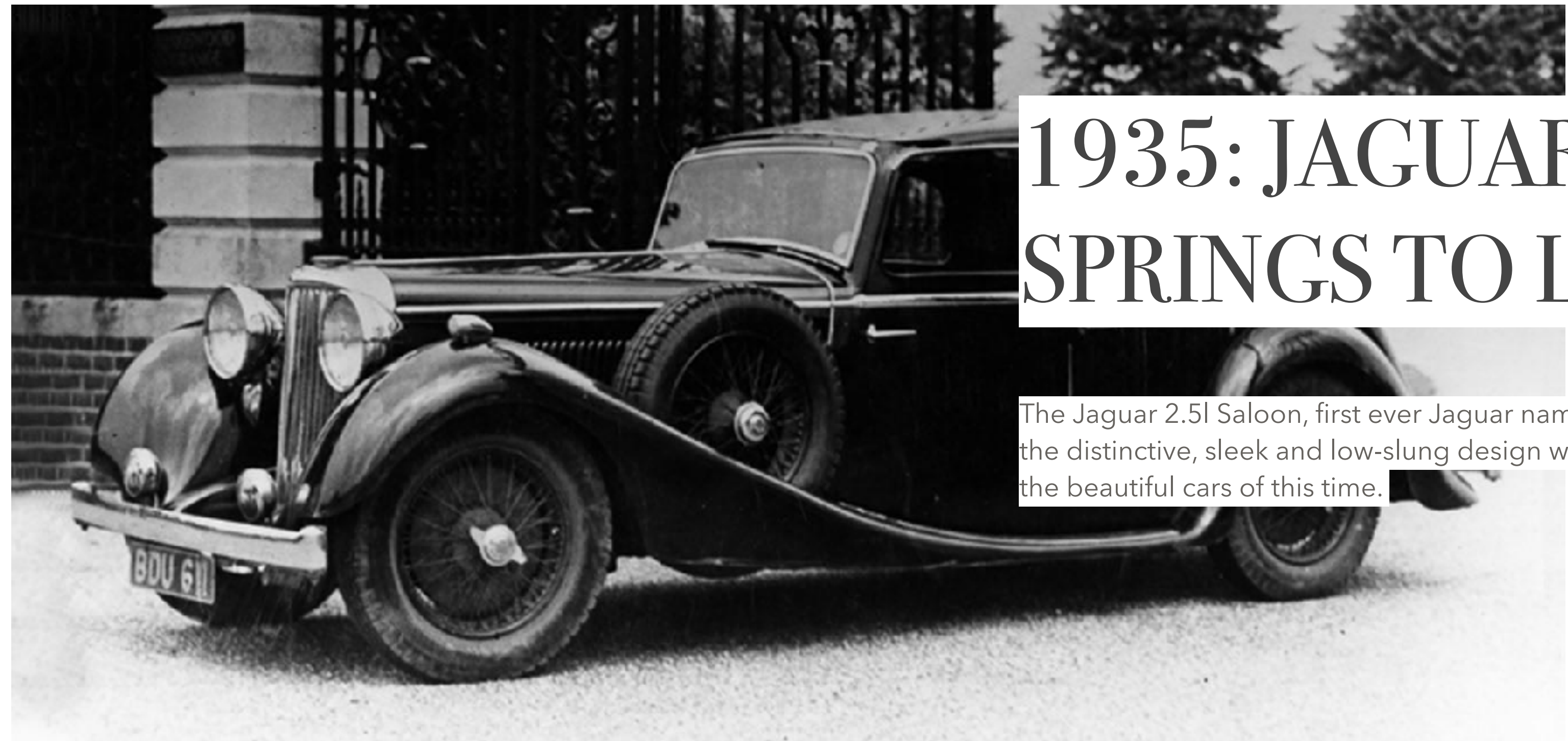
2016 Jaguar's first SUV. Since 2016 Jaguar participate in Formula E Championship.

2019 Jaguar's first electric car.



4.2 JAGUAR DESIGN DNA

In my project, I concentrate on a Jaguar's coupe and sports cars design DNA which tells a lot of a they design DNA and why they are so elegant and sexy.



1935: JAGUAR SPRINGS TO LIFE

The Jaguar 2.5l Saloon, first ever Jaguar named car with the distinctive, sleek and low-slung design was one of the beautiful cars of this time.

1948: STEALING THE SHOW

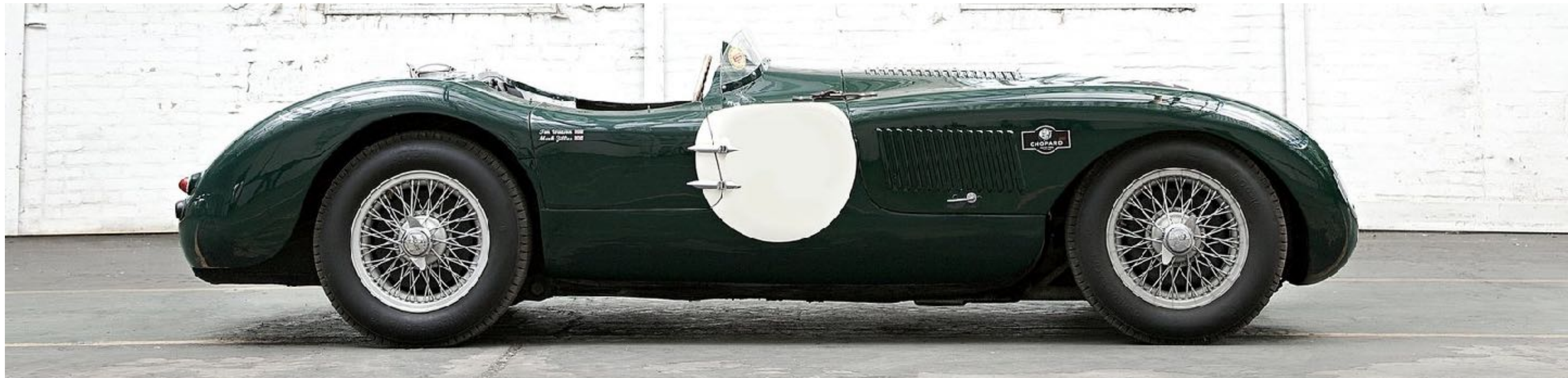
The Jaguar XK120 was designed by William Lyons only in just a few months and still, it has become one of greatest, iconic and sensational design. Fenders running the length of the car's body, new vertical grill design which becomes a Jaguar signature over the next two decades, the low, flowing lines reflected Lyon's love of motorcycles and may have drawn on the aircraft design techniques which he came to know during the wartime.

Definitely one of my favorite design.



1951: THE PURE-BRED RACER

The Jaguar C-type one of the most beautiful racing cars of its time. Malcolm Sayer's masterpiece, fluid shapes from the aircraft industry, lightweight design which is around 25% less than XK and advanced disc brakes. C-type is one of the famous cars of the Jaguar because of its successful racing history. It won 1951 Le Mans and undoubtedly its best performance first, second fourth and ninth place in 1953 Le Mans.



1954: BREAKING NEW GROUND

The Jaguar D-type was the first to use monocoque construction technique from aircraft design. The fluid shape of the D-type was born from many hours in the wind tunnel. The oval air intake, the sweeping bonnet, the half-faired rear wheels, the distinctive and stabilizing tail-fin, these conspired to make one of the most beautiful competition cars ever produced. Once again Malcom Sayer was that man behind of this superb aerodynamic shape. D-type is literally made around the driver.

D-type with long nose and tail-fin is one of my favorite designs.





1960: A TRUE ICON

"Jaguar in the 1950s and 1960s was a really cool, modern brand. It wasn't very consistent, and the cars didn't bear a strong family resemblance, but the fundamental brand values - the sense of excitement, the purity - drove everything." - Ian Callum, Jaguar Director of Design

The Jaguar E-type with its impossibly long and elegant bonnet, sleek monocoque design and sexy shape is the one who put every rival in the shade. It perfectly encapsulated the feline grace of the Jaguar name. The E-type was once called "the greatest crumpet collector known to man" by America's Road & Track magazine and has since become one of the most-loved examples of British car design.

"The most beautiful car ever made" -Enzo Ferrari

1966: THE GREATEST JAGUAR THAT NEVER WAS

The Jaguar XJ13 was a purpose to become proper Le Mans car. But owing to changes in regulation and an emphasis on production cars, the overall project stalled. The shape of the XJ13 was a masterpiece, and though only one was ever built. It was fitting tribute to the work of Malcom Sayer who had shaped Jaguar design forever. Compact, lithe and innately feline, it even showcased its spectacular V12 engine beneath its rear window.

This car is an art on the wheels



1975: REPLACING AN ICON



The Jaguar XJ-S is the next generation of E-type's. With its looks, Malcom Sayer created a more aerodynamic car than its predecessor, thanks to its flying butter C-pillars and concave rear window.

1992 FASTEST CAR EVER

The Jaguar XJ220 super low, super fast supercar. It was fastest production car on the top speed and on the legendary Nürburgring. Handling also super smooth. At the first time when the XJ220 was shown as a concept model, it has 6,2-liter V12 engine and scissors doors but produced car was made with regular doors and V6 twin-turbocharged engine which was still powerful.

Definitely one of the cars that I would love to drive.



1996: THE FASTEST SELLING SPORTS CAR



The Jaguar XK8 is definitely inspired by old iconic Jaguars. The shape of the XK8 is sleek and shallow but still met all the modern requirements of space, safety and luxury. The XK8 went on to become the fastest selling sports car in Jaguar's history at the time.



2006: A NEW DESIGN DIRECTION

"Jaguars don't have to look identical, but the values have to be the same. Powerful, dramatic, and just that 10% different to everyone else on the road" – Ian Callum, Jaguar Director of Design

The Jaguar XK is the first car of the millennium and the first designed under the aegis of Ian Callum. The XK is definitely a car of the 21st century but still with a clear heritage of classic Jaguars in the grille, rear lights and in innovative aluminium monocoque construction. The references to the great past Jaguars are there. It was elegance, redefined with a deft touch.

2012: MOVING FORWARDS

The Jaguar F-type, "Car of the Year" at 2013 Middle East Motor Awards. The F-type is the true embodiment of the Jaguar marque. Its thrilling performance is coupled with design touches that both lead Jaguar forwards and hark back to its heritage, with a clear influence from E-type.

The new interpretation of the bold Jaguar grille shows this intent, differentiating itself while reflecting the same values of the past decades. The personality of F-TYPE is characterized by the cockpit-rearward stance, power bulge on the sweeping clamshell bonnet, and muscular rear haunches. It's clear that F-TYPE is the spiritual successor to E-type.

4.3

SPACIAL VEHICLE OPERATION (SVO)

In 2014 Jaguar founded Spacial Vehicle Operation where they are creating unique ultimate Jaguar vehicles. Fastest, most luxurious, incorporating the highest levels of technology and performance. The result is exclusive, desirable and collectable vehicles.

XE SV PROJECT 8 THE MOST EXTREME
PERFORMANCE JAGUAR EVER

SUPERCHARGED HEART

ALUMINIUM ARCHITECTURE

A REAL CONNECTION TO THE ROAD

PERSONALISED TO YOU



© Picture: Jaguar.com, 2018

F-TYPE SVR THE MOST POWERFUL
PRODUCTION CAR JAGUAR HAS EVER
UNLEASHED

INTERIOR STYLE

LIGHTWEIGHT TECHNOLOGIES

AERODYNAMICS

POWERTRAIN TECHNOLOGY



© Picture: Jaguar.com, 2018

4.4

JAGUAR

HERITAGE



1961 GENEVA MOTOR SHOW, E-TYPE LAUNCH WITH WILLIAM LYONS



E-TYPE CONCEPT ZERO FROM 2017

"Jaguar started with style and elegance then they become multiple champions in the motorsport. Time passed and Jaguar invented new super fast cars, new beautiful aerodynamic shapes. Also, Jaguar moves to the next motor technology, but the heritage always remains."

-Ian Callum, Jaguar Director of Design

Jaguar keeping going with the new technology and create new astonishing cars but they also restored old classics. That means they have vehicles from the 50's and 60's which are completely brand new.

Also, Jaguar creates really special and unique vehicles. When you look at those pictures you see same looking cars but actually, they are completely different. On the left is the first one Jaguar E-type at launch day and on the right is the 2017 electric-powered E-type Zero which is in my opinion definitely dream car.

© Left picture: EVO.uk, 2018

© Right Picture: NetCarShow.com, 2018



5. PROCESS AND METHODS



5.1

INSPI

RATION

Inspiration from Finnish nature and classic's shapes, minimalist and elegant style with the touch of racing heritage.

My design focused on Jaguars sports cars, especially represent D -type's heritage with smooth, wavy and sexy shape, lightweight aluminium structure and famous tail fin.

The nature of my hometown is one of my inspirations, which I always consider.

© Three picture from the left: Ivo Mikkulainen, 2018

© Right picture: NetCarShow.com, 2018



"If you look at any Jaguar in history, the one thing it's got against all the other cars is that it's always a more exciting shape. When you see a Jaguar on the road it catches the corner of your eye and you want to turn around and look at it. That's what a Jaguar must do."

-Ian Callum, Jaguar Director of Design



5.2

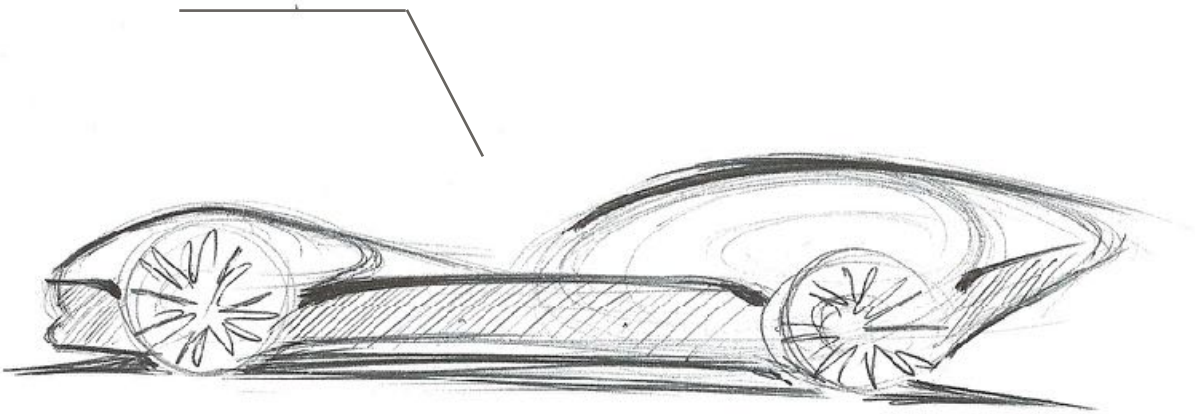
WORK

FLOW

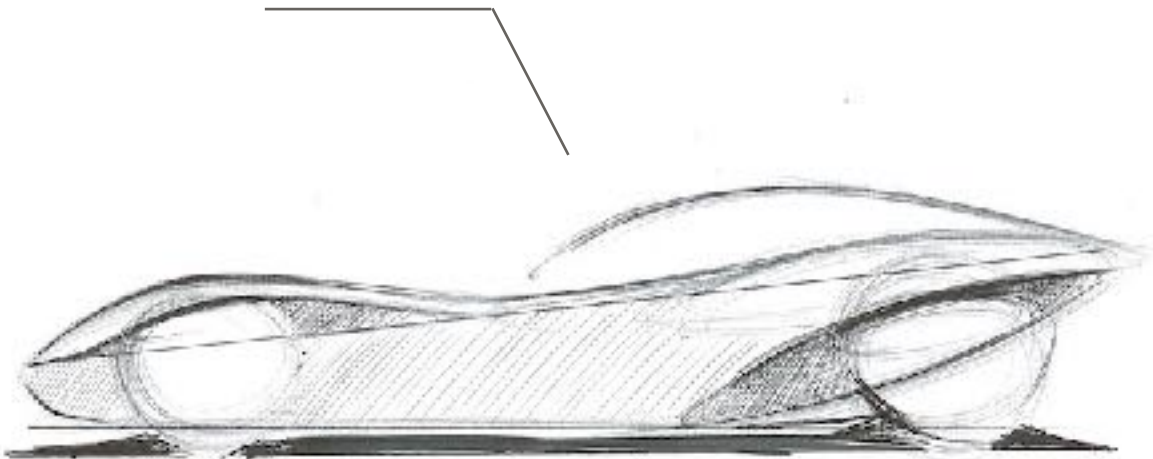
From these pictures, you can see that my workflow was a pretty mess. After first sketches which I liked, I started to do first renders and with them I started to do clay modeling. When clay model starts to get right shape I took pictures which I used to create new better designs and better shapes and after that, I repeat from the start. I used Ipad Pro and printed paper with a ballpoint pen. Actually, with this circular way, I create always better and better shapes in the sketches and also on the clay model.

5.3 DESIGN IDEATION

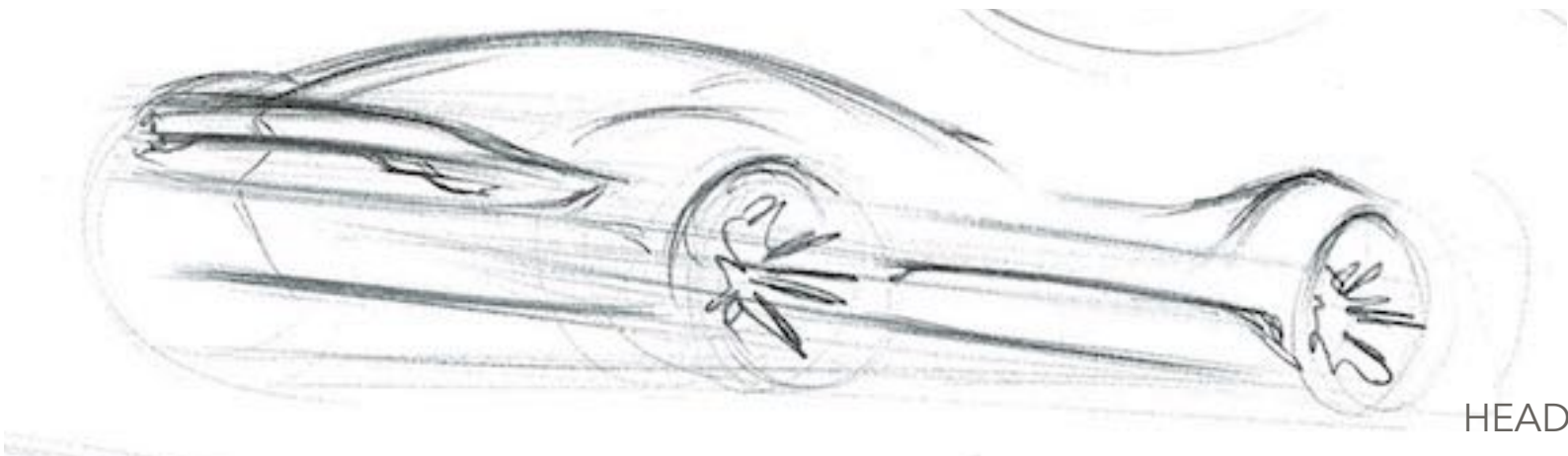
STARTED WITH CRAZY LOOKING DESIGN WITH JAGUARS ROOF SHAPE



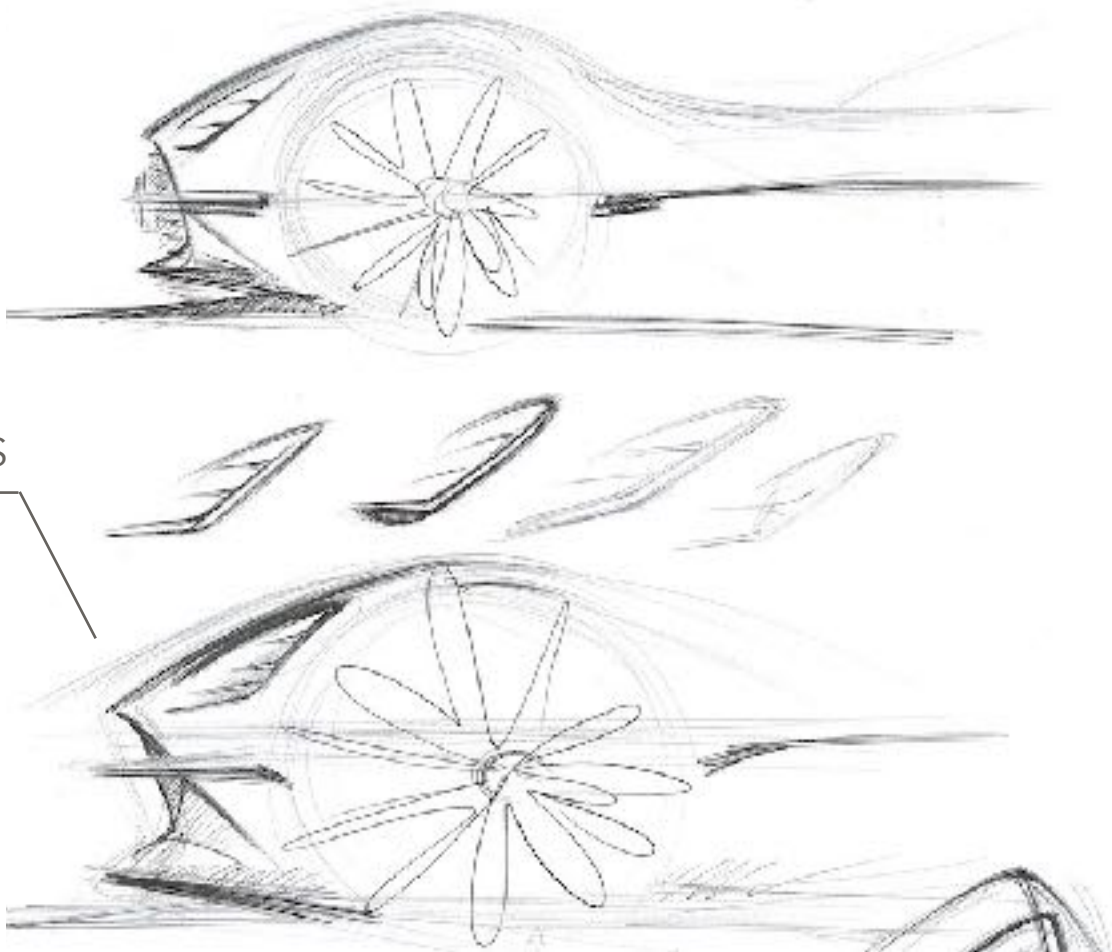
TESTING WHEEL ARCH DESIGN



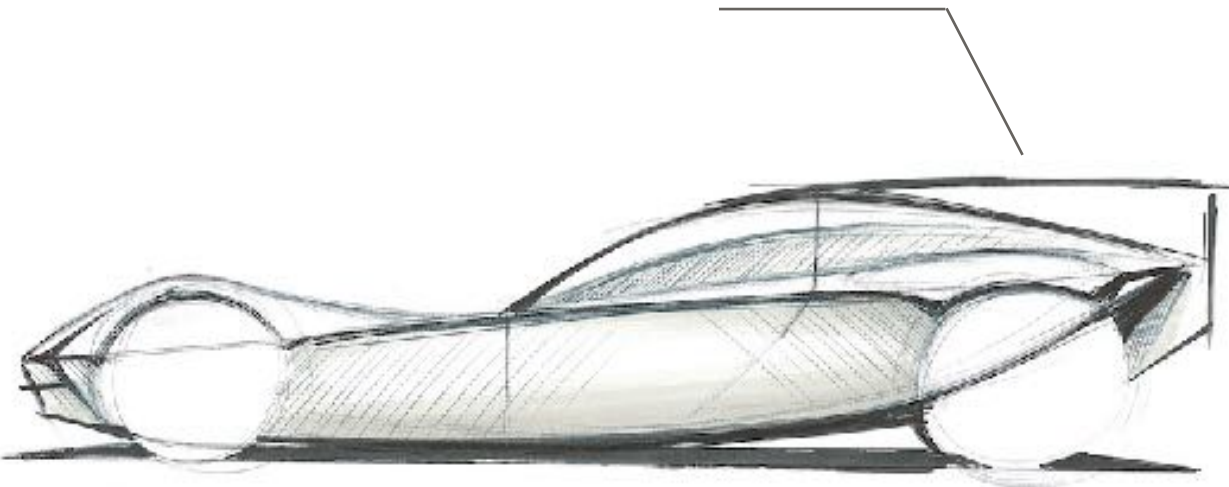
SOMETHING RIGHT AND SOMETHING NOT



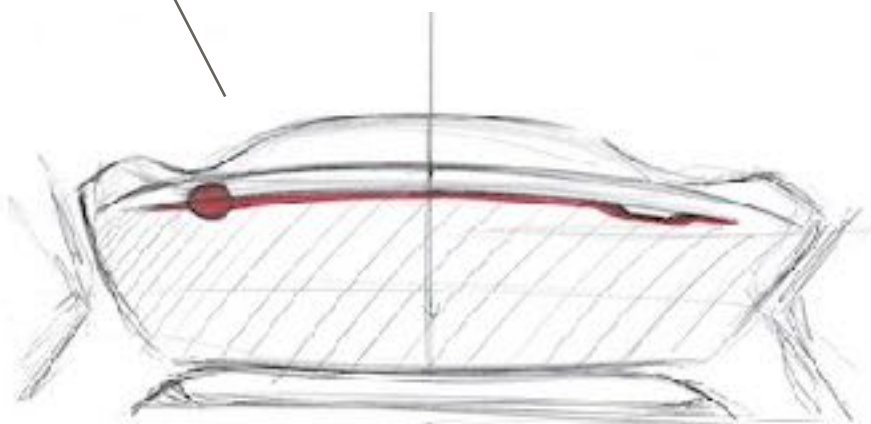
HEADLIGHT TESTS



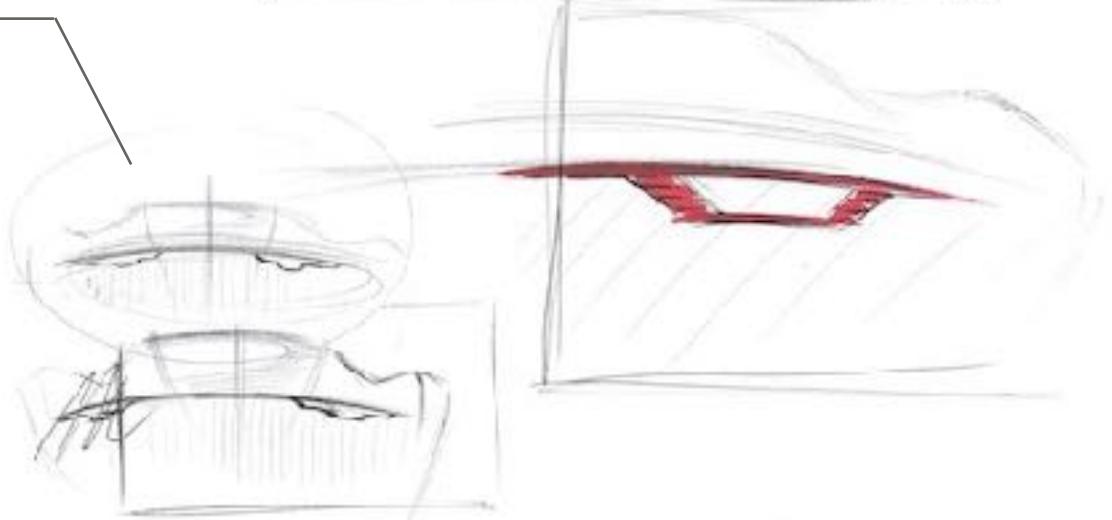
ADDED A TAIL FIN



FIRST BACK VIEW SKETCH

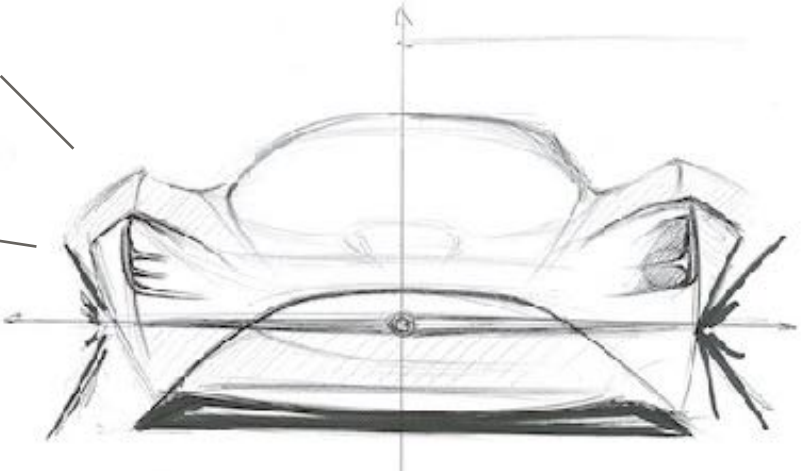


INTERESTING

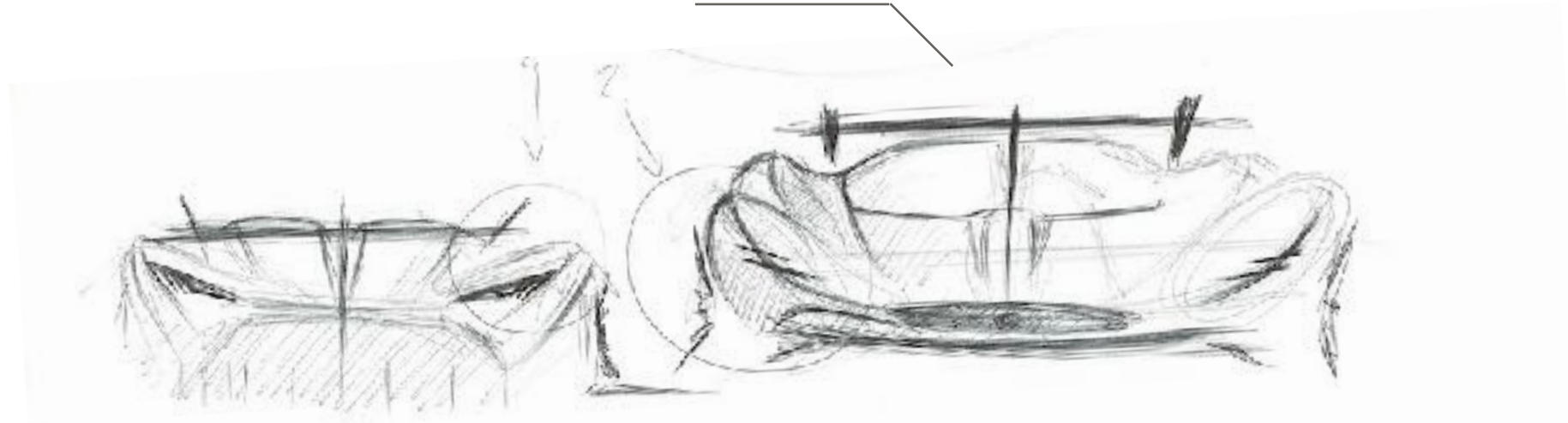


FIRST FRONT VIEW

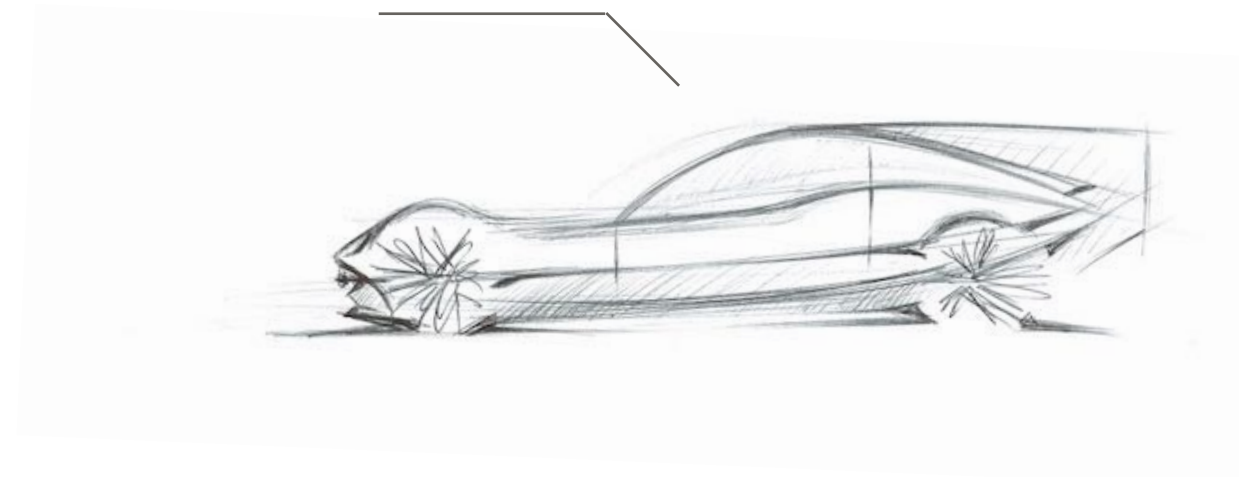
NOT REALLY WORKS



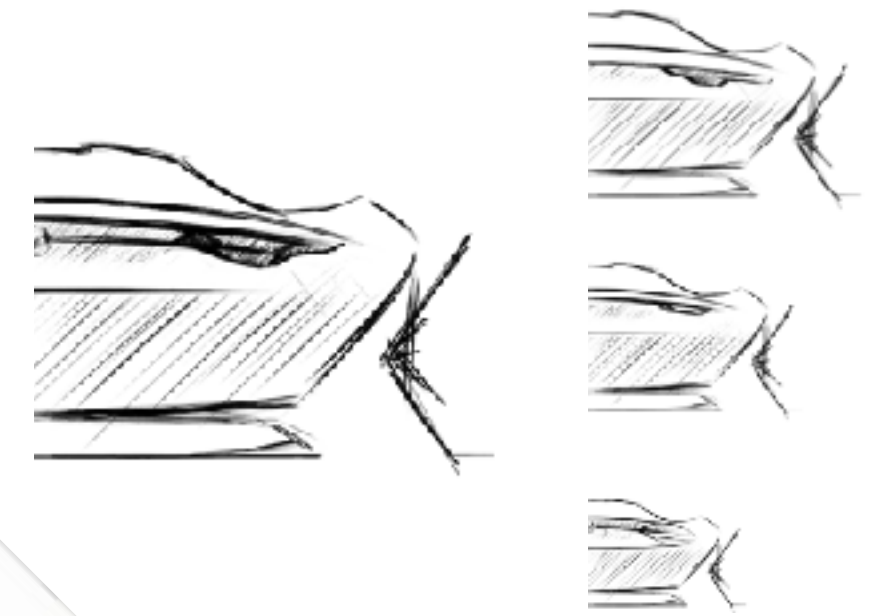
TESTING BUT THIS TWO
SKETCHES NOT RIGHT



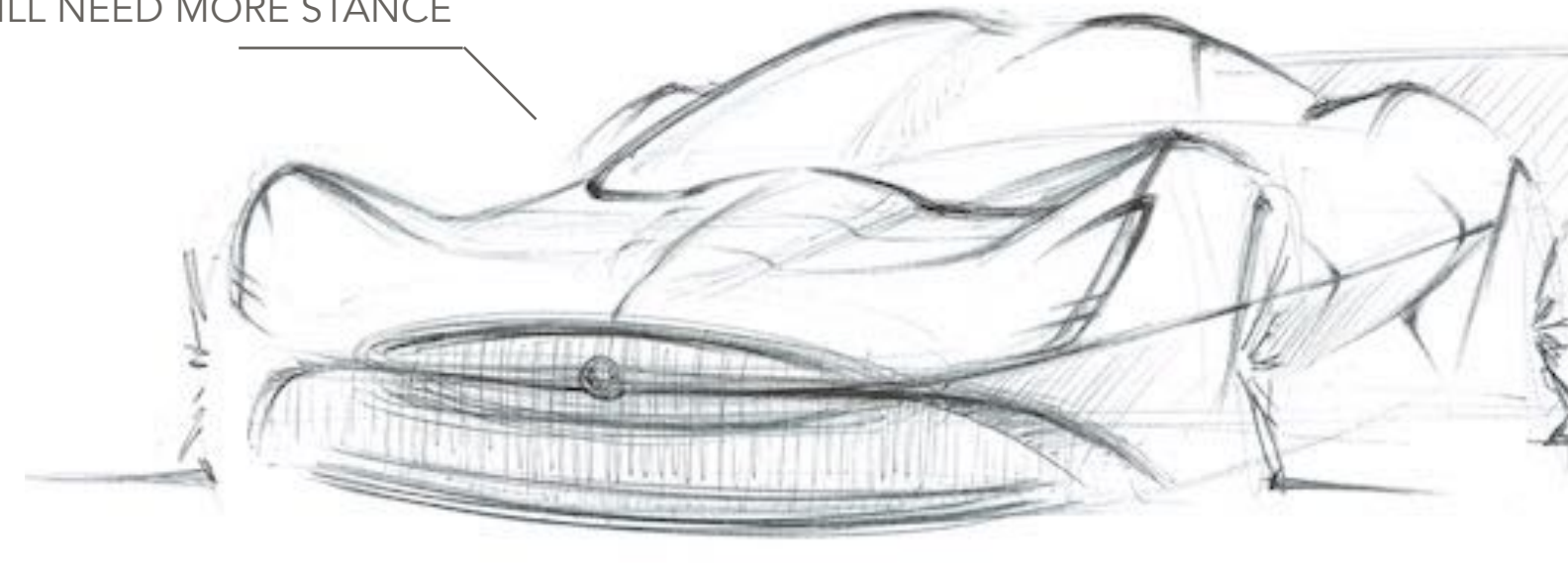
TOO SHORT, NEED MORE
LENGHT FOR LOOKS



A LOT OF TESTS FOR RIGHT
BACKLIGHTS BUT DESIGN IS STILL
NOT THERE WHICH I WANT



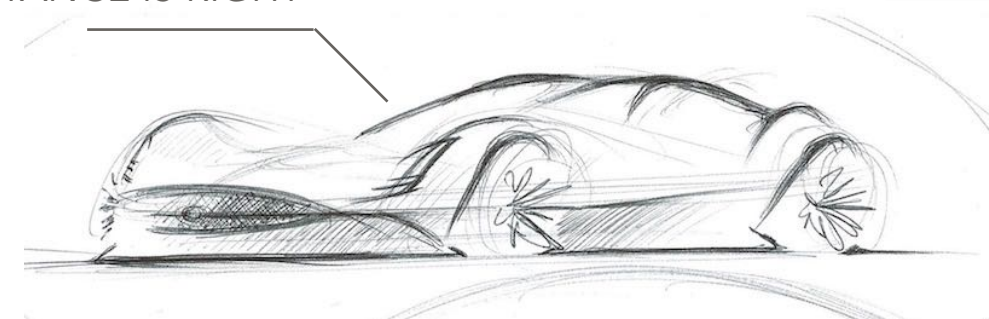
SHAPE DESIGN LOOKS COOL BUT
STILL NEED MORE STANCE



LOOKING GREAT



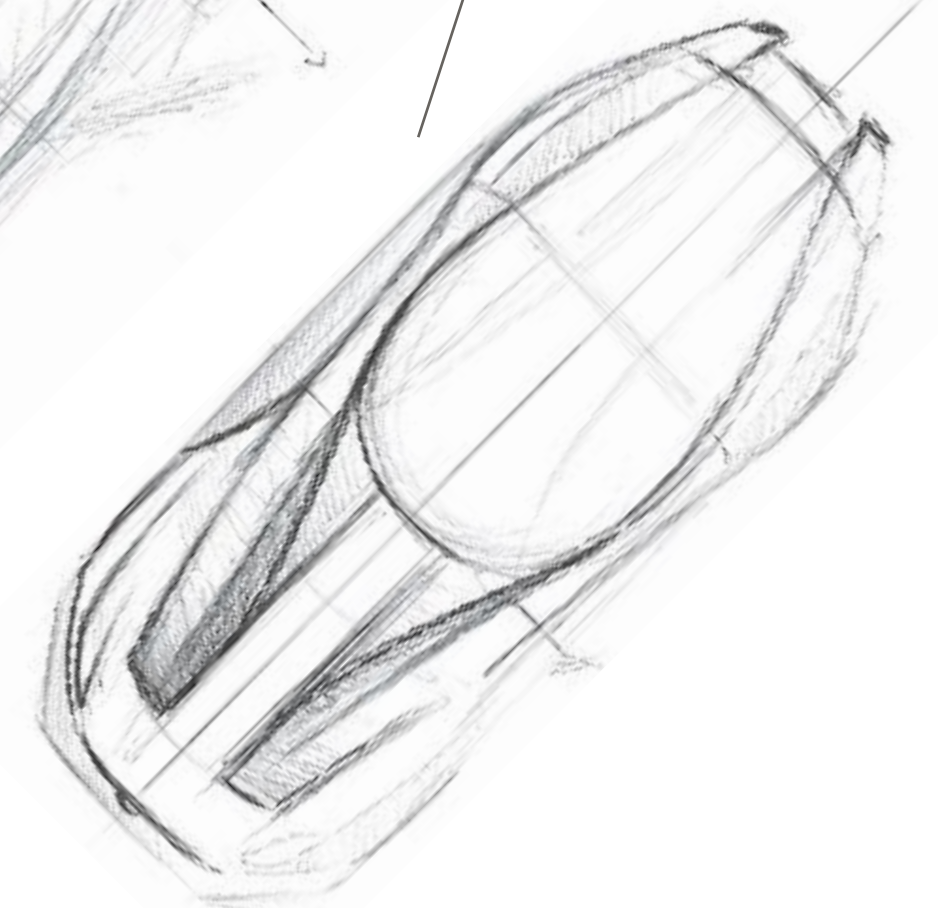
LOOKS FUNNY BUT STANCE IS RIGHT



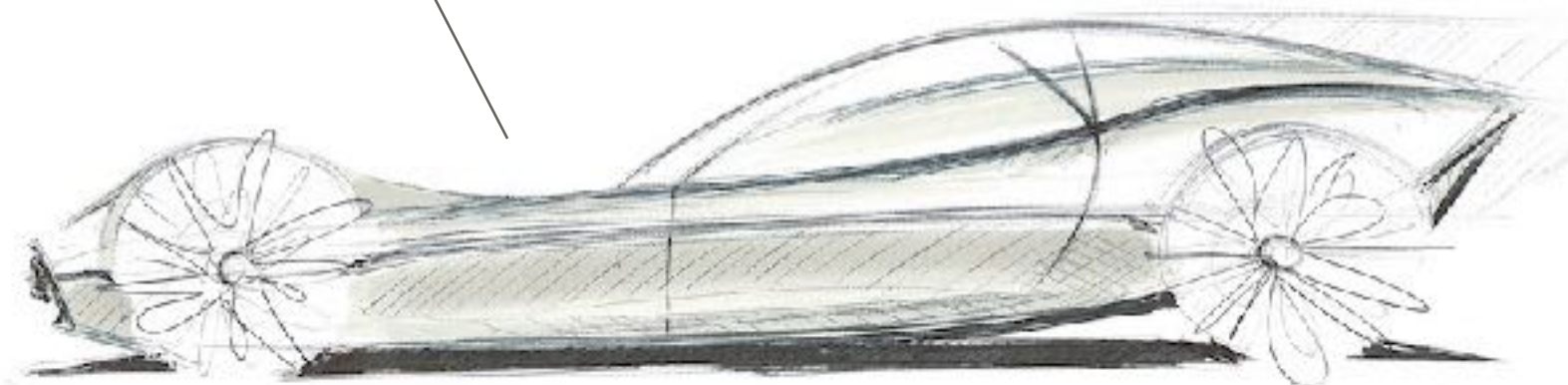
FIRST TOP VIEW AND I LIKE IT
ALREADY

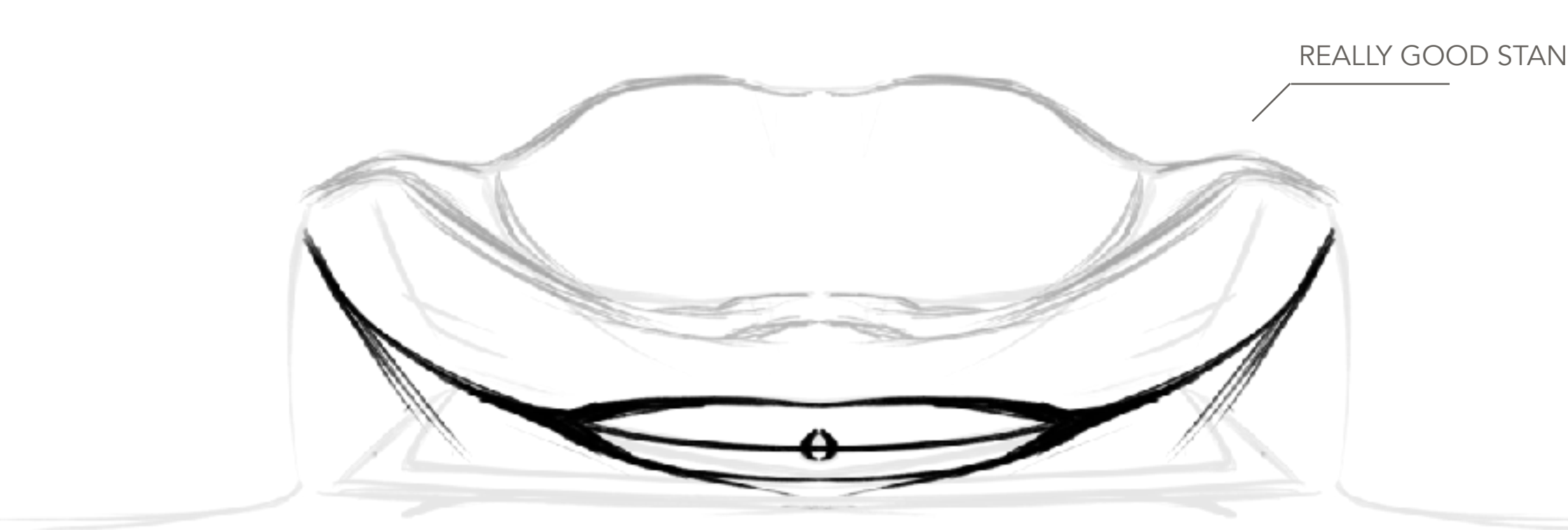


TESTING SOMETHING
DIFFERENT BUT THIS IS
NOT WORKING



SIDE VIEW STARTS TO GO RIGHT WAY

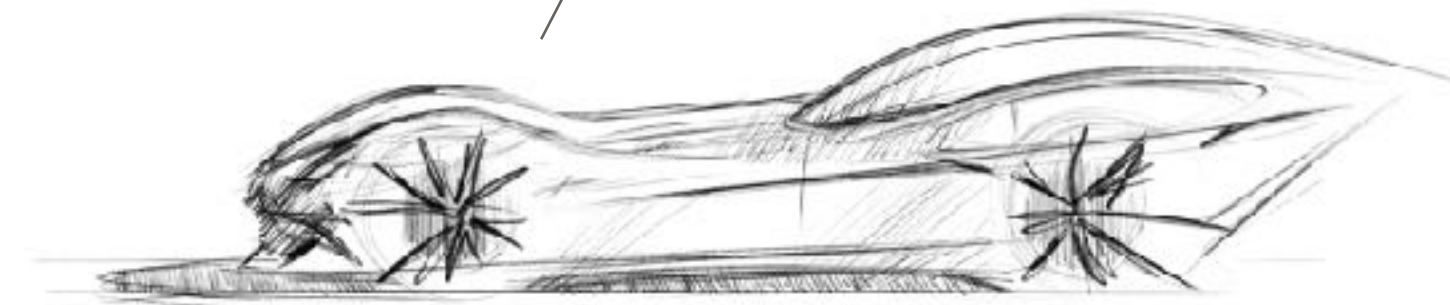




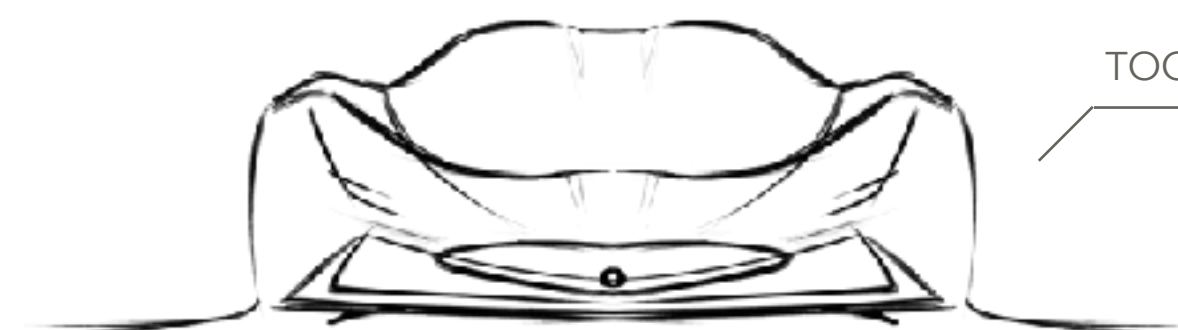
REALLY GOOD STANCE AND GRILLE



TRYING TO GET COOL AND JAGUAR'S LIKE GRILLE

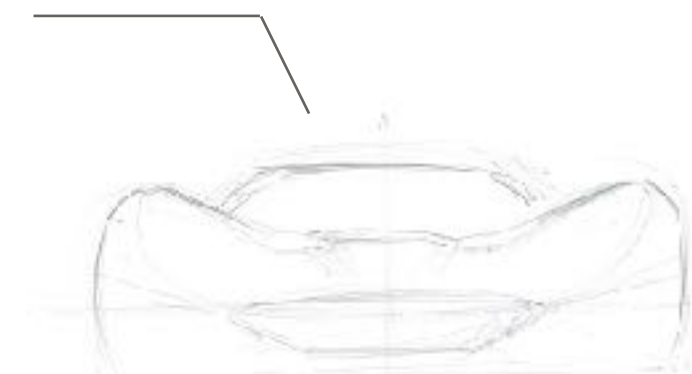


THIS ONE I LIKE BUT CABIN IS TO FAR AWAY

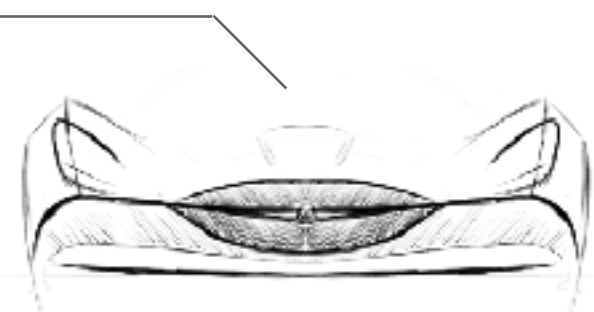


TOO MUCH CORVETTE STYLE

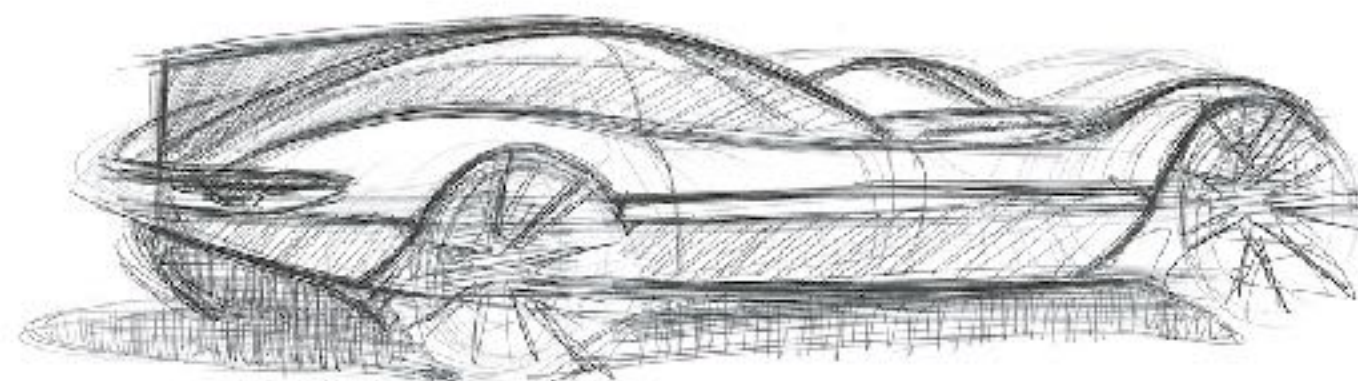
NICE SIMPLE SHAPE



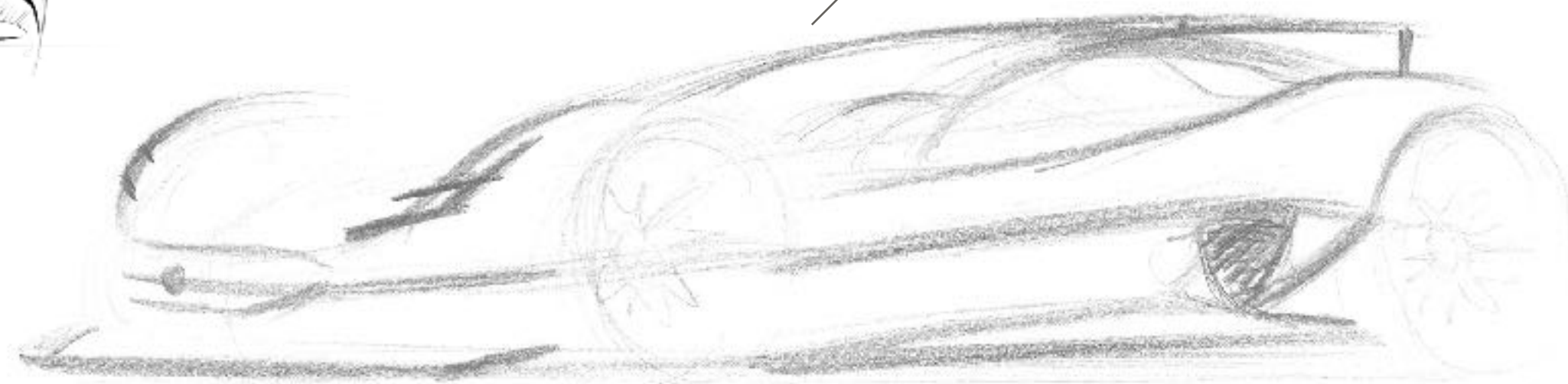
FIRST TEST OF GRILLE



NICE FRONT FENDERS, OTHERWISE TOO OLD SCHOOL DESIGN

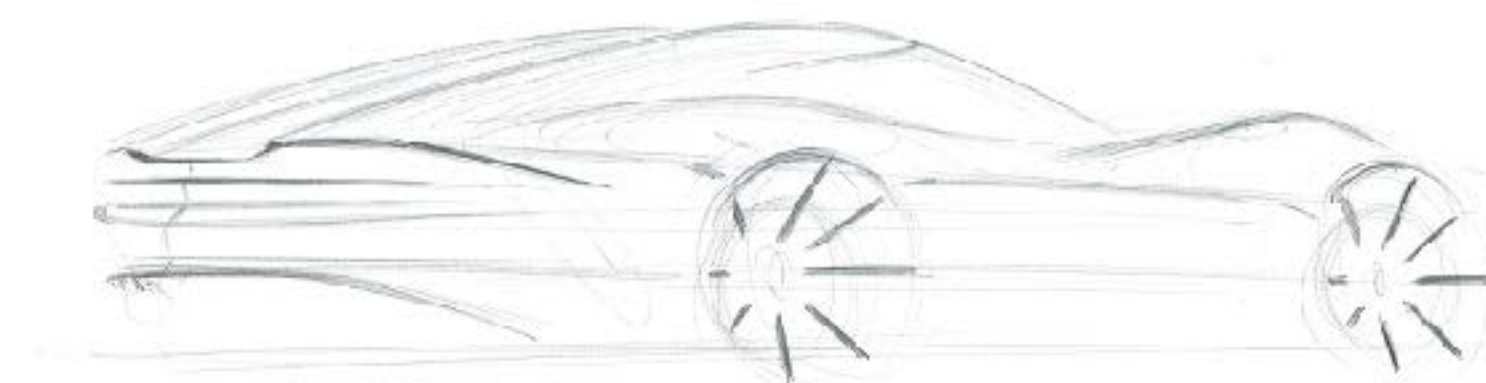
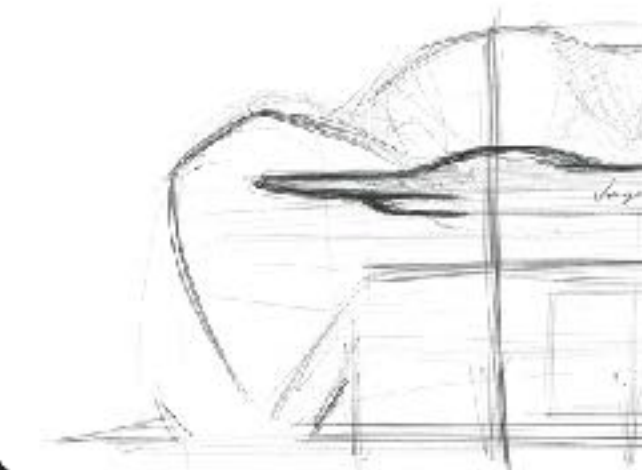
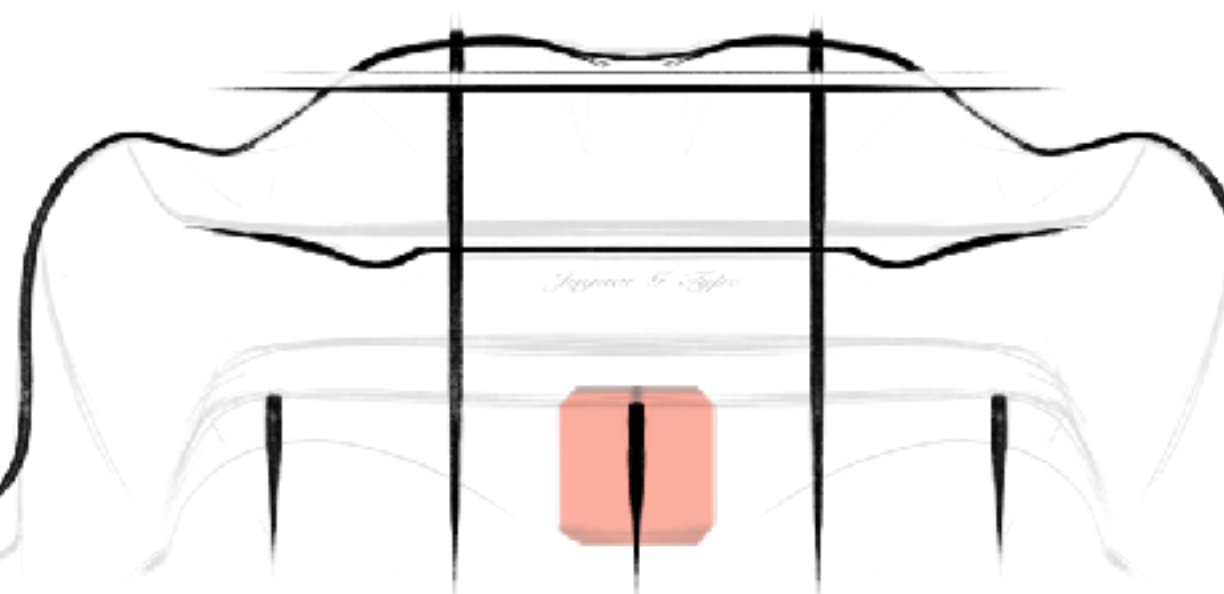


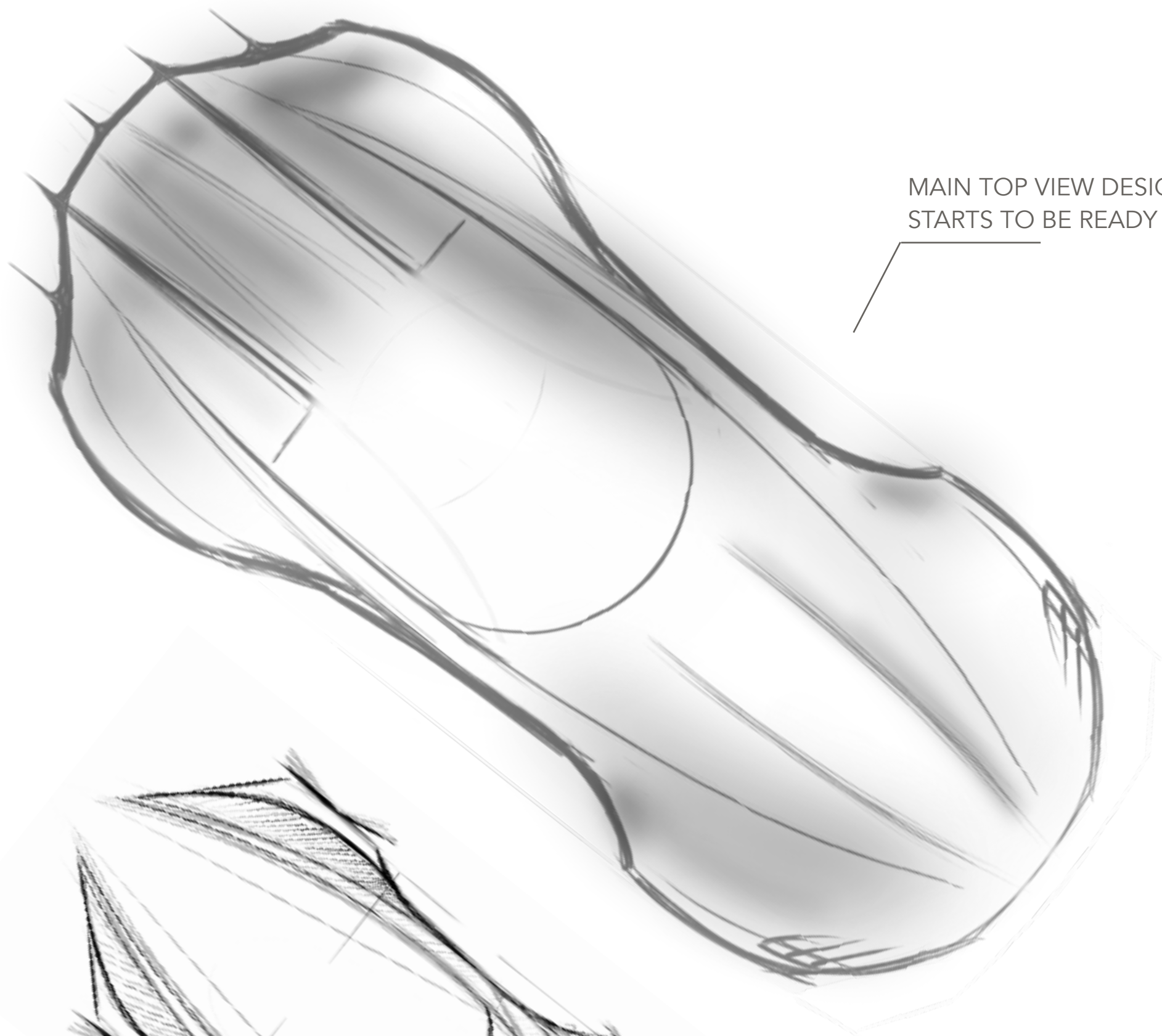
THIS ONE IS GOING RIGHT DIRECTION



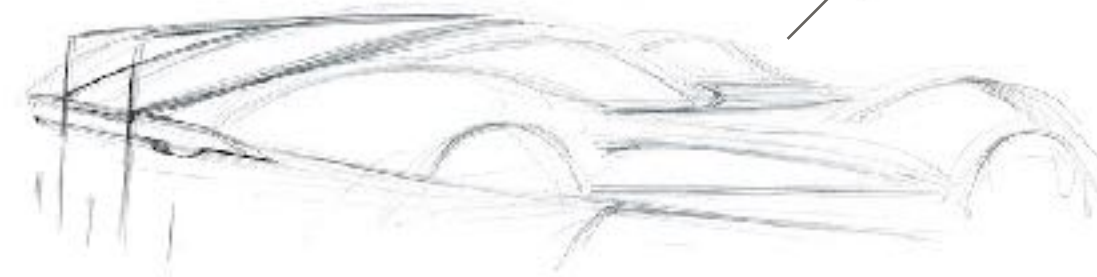
THIS BACK VIEW STARTS TO LOOK RIGHT

TOO MUCH ASTON MARTIN

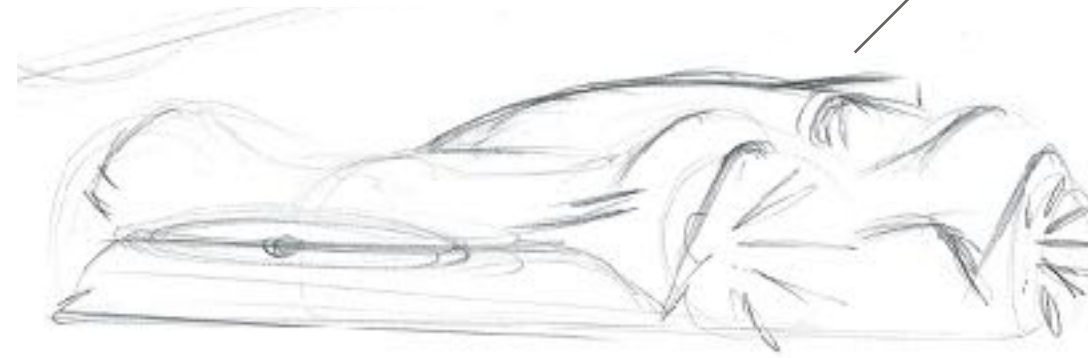




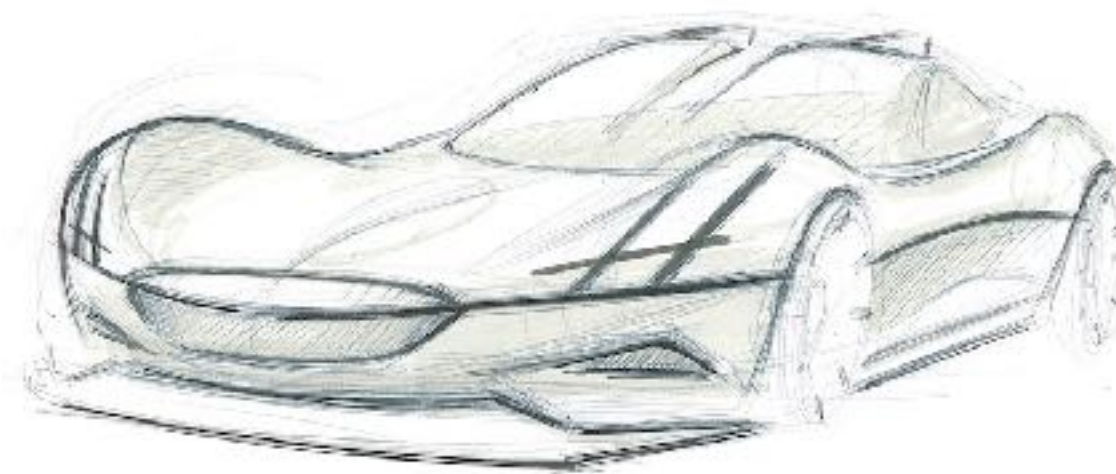
MAIN TOP VIEW DESIGN
STARTS TO BE READY



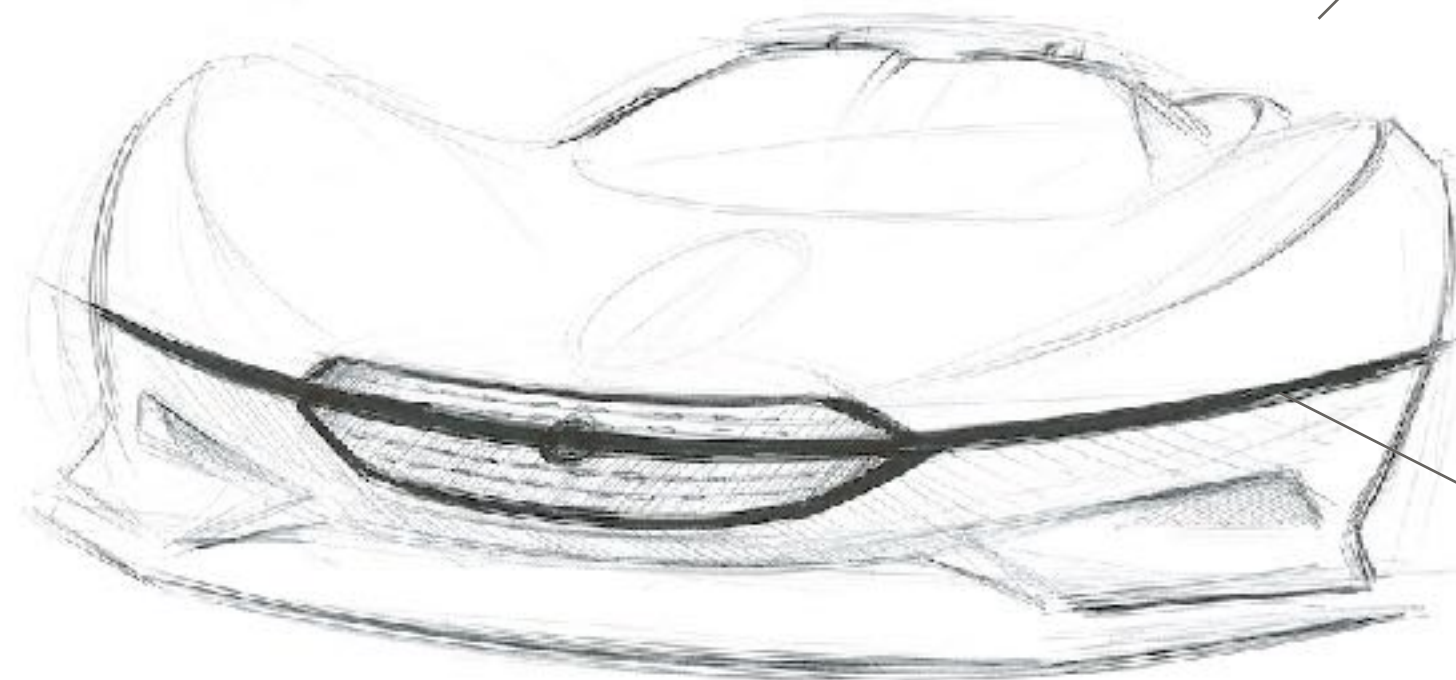
I SEE POTENTIAL IN THIS ONE



NOT EASY TO GET RIGHT
PROPORTIONS

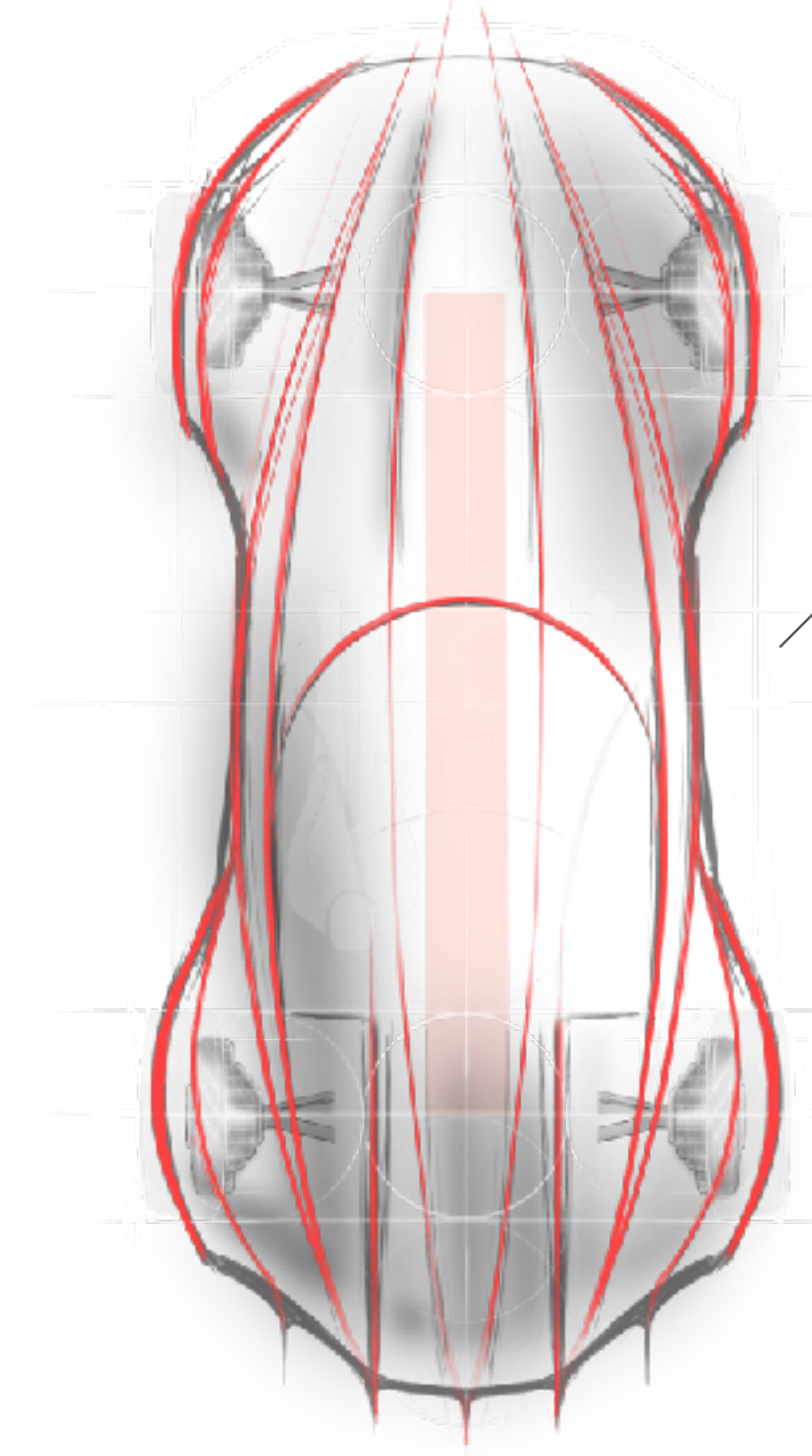


RIGHT PROPORTIONS

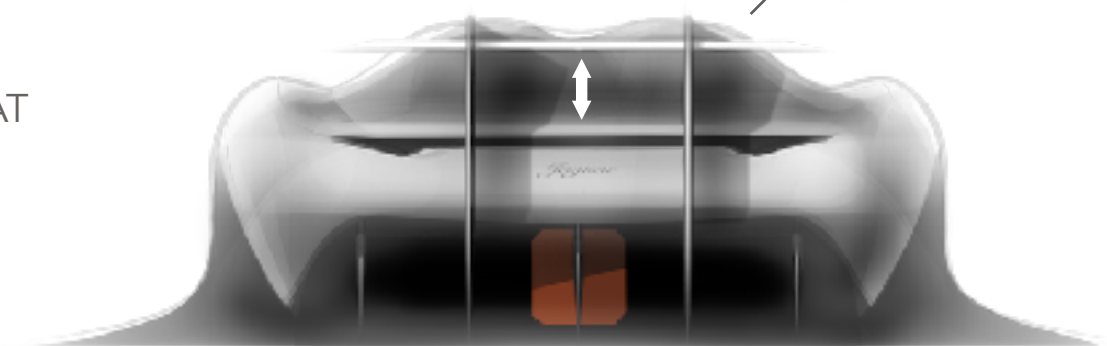


THIS ONE LOOKS GREAT

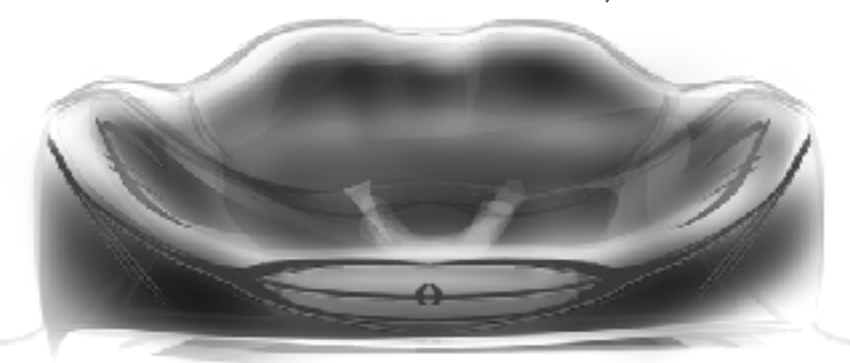
AIR INTAKE



LINES



SPOILER HIDES IN TO BODY PANELS



BUBBLE ROOF



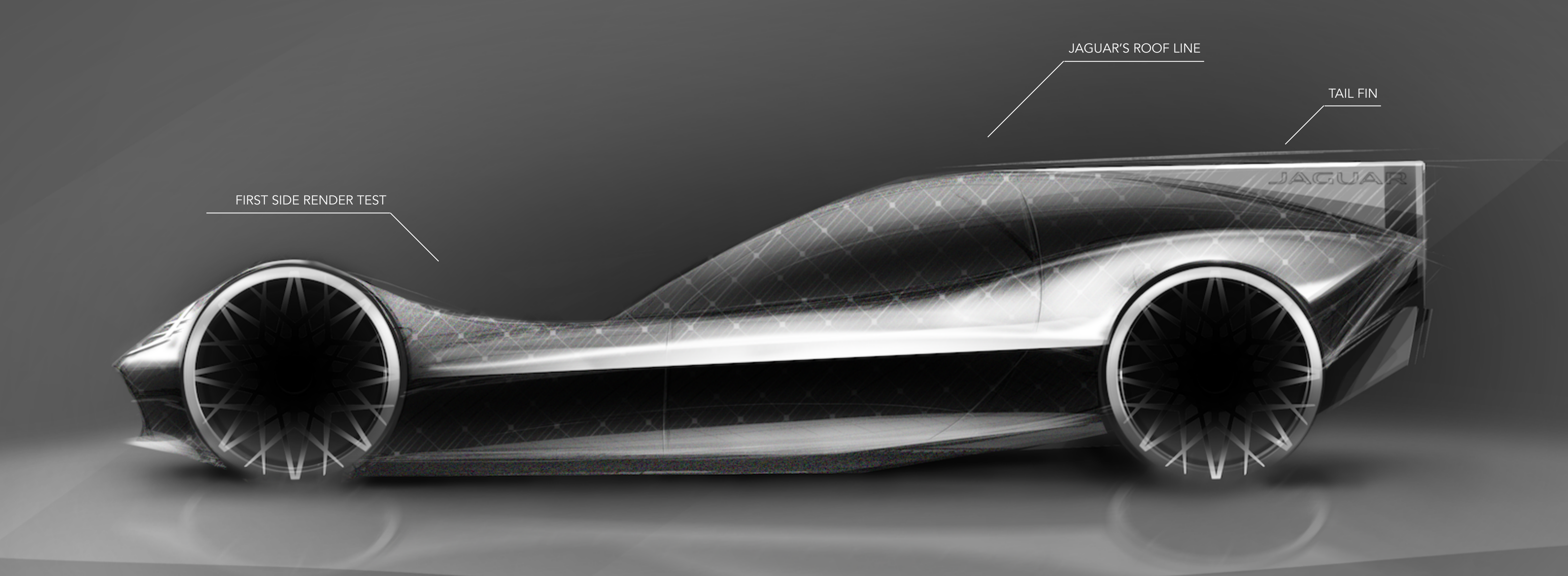
NICE BUT NEED MORE
AGGRESSIVE LOOK

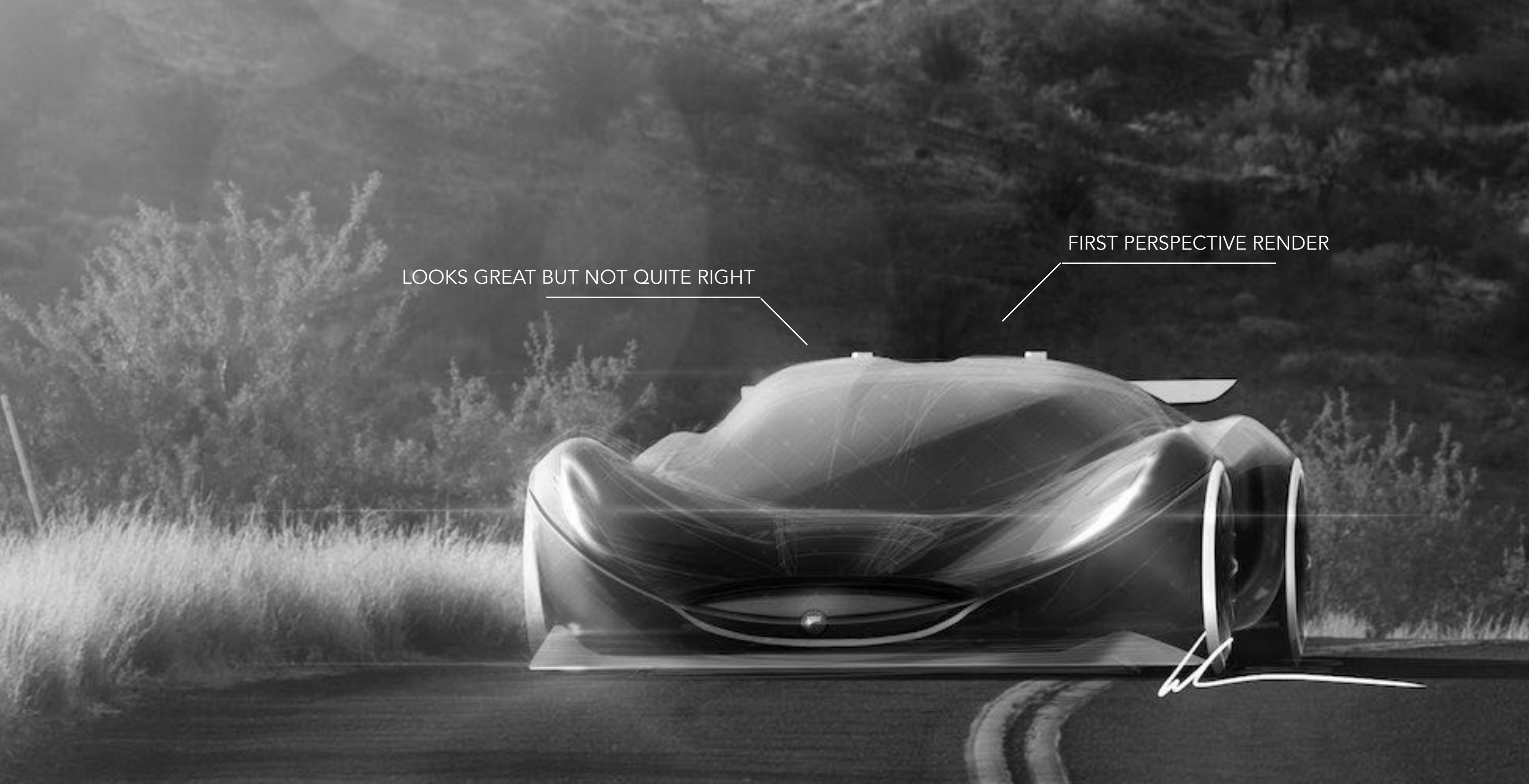
TOO MUCH FERRARI

LOOKS LIKE CAT
SCRATCH

NICE BUT TOO SCARY

Testing headlight design





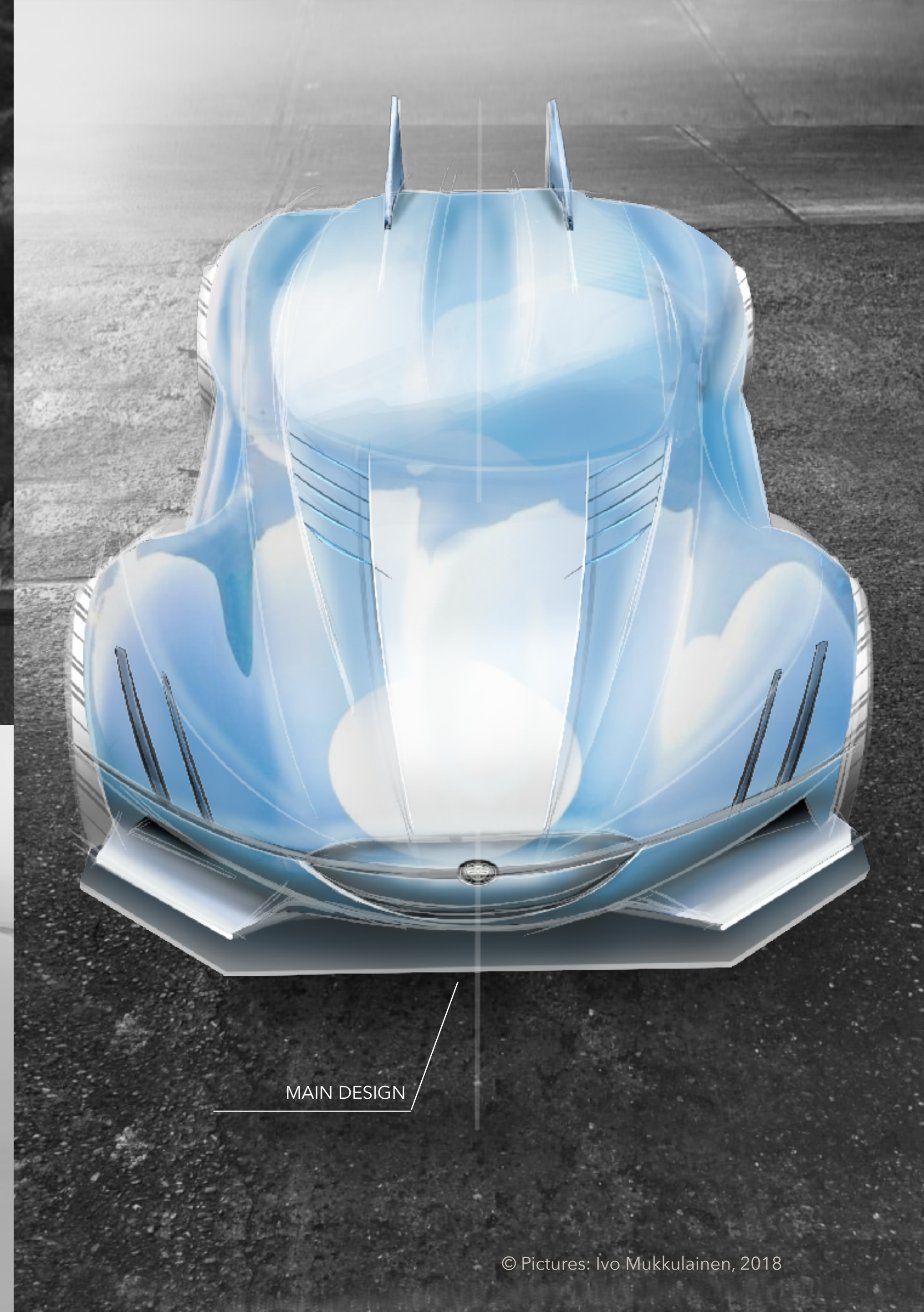
LOOKS GREAT BUT NOT QUITE RIGHT

FIRST PERSPECTIVE RENDER

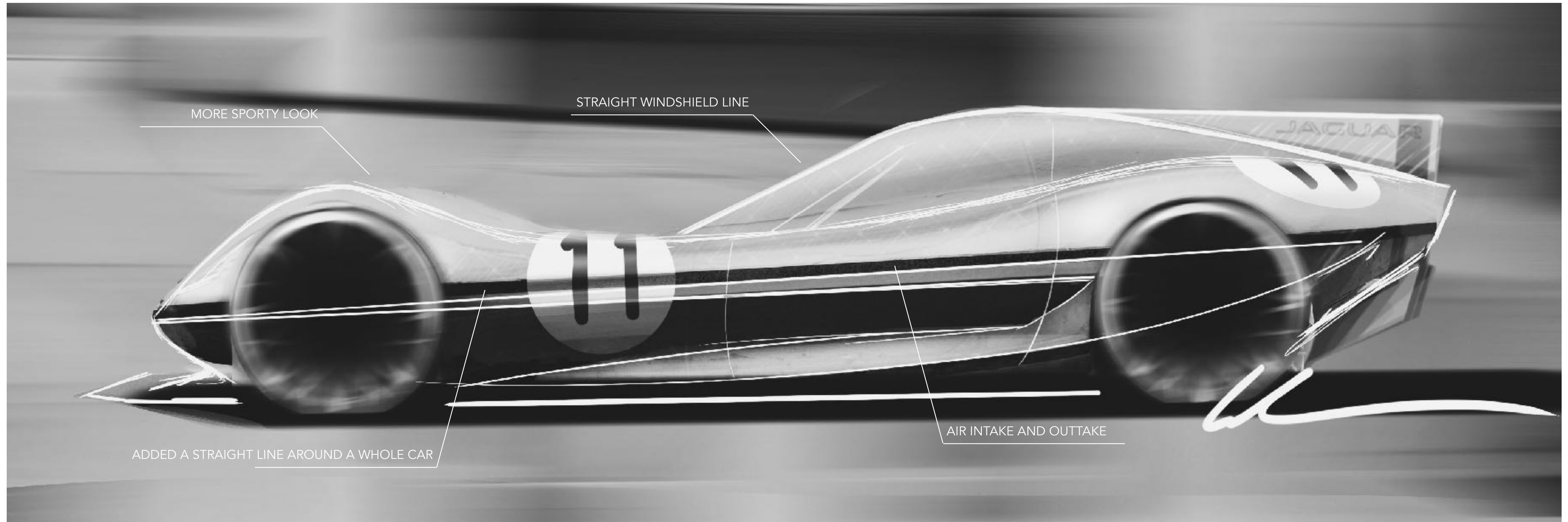


RIGHT DIRECTION

JAGUAR

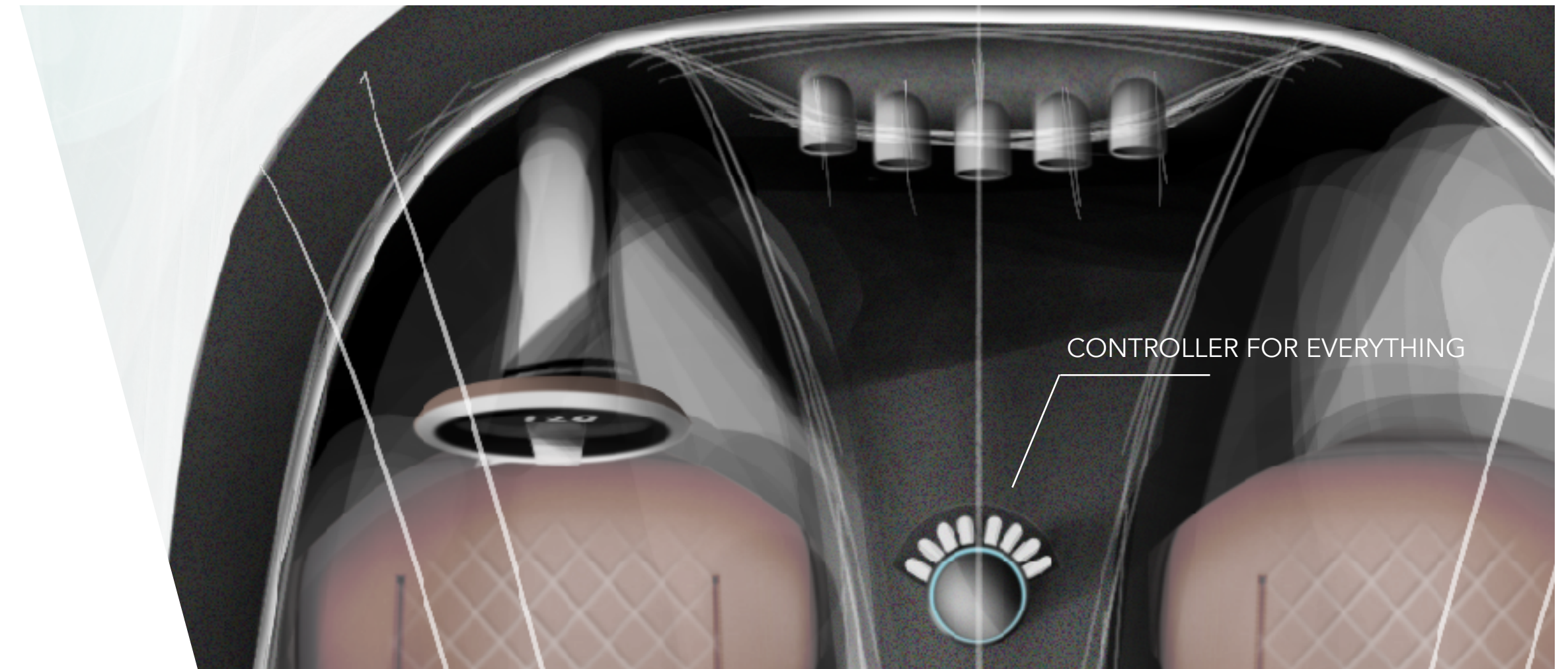
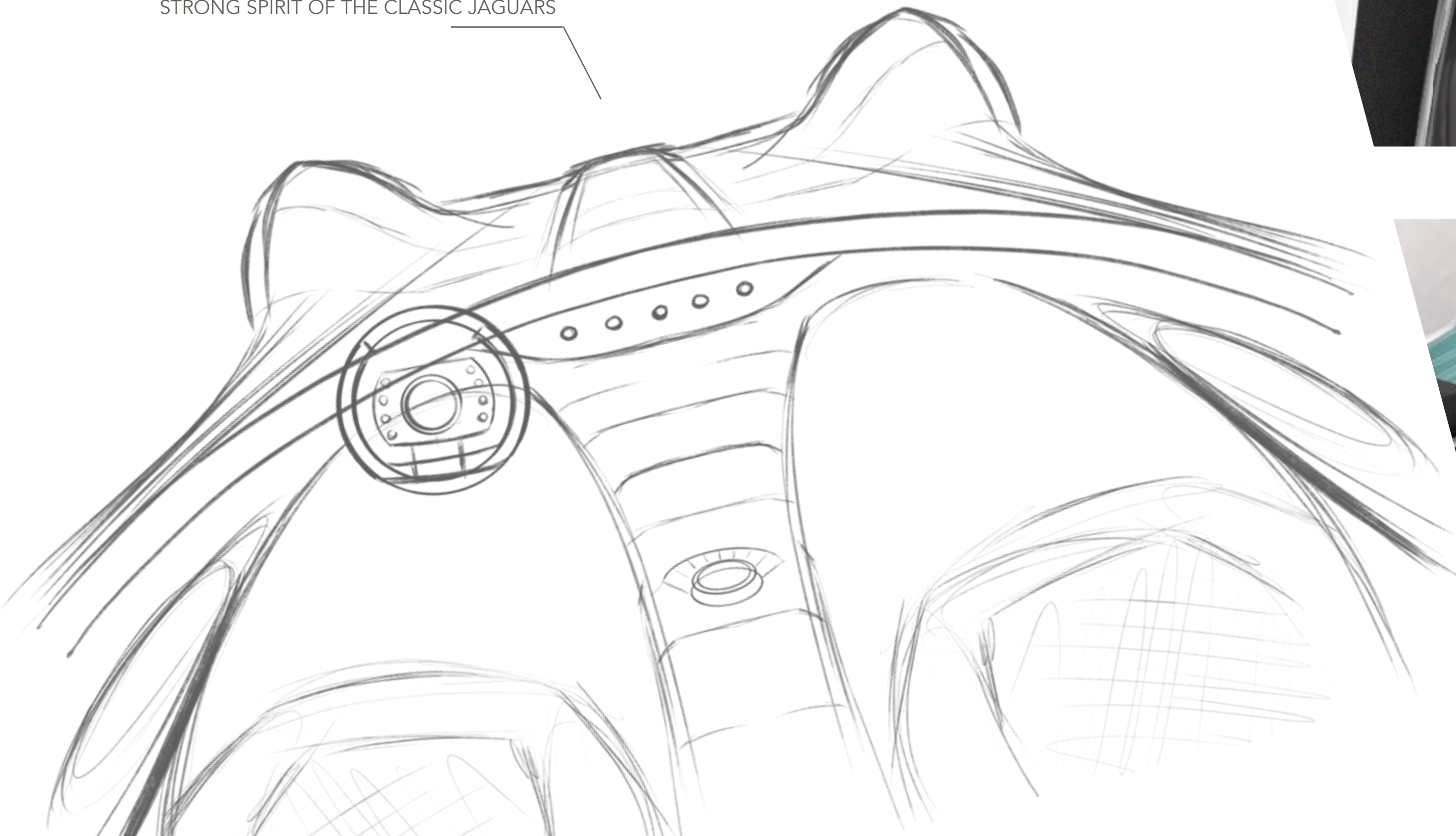


MAIN DESIGN



5.4 INTERIOR DESIGN

STRONG SPIRIT OF THE CLASSIC JAGUARS



CONTROLLER FOR EVERYTHING



START THE ENGINE, AC,
VOLUME...

STEERING WHEEL WITH
TOUCHSCREEN

SIMPLE AND BEAUTIFUL

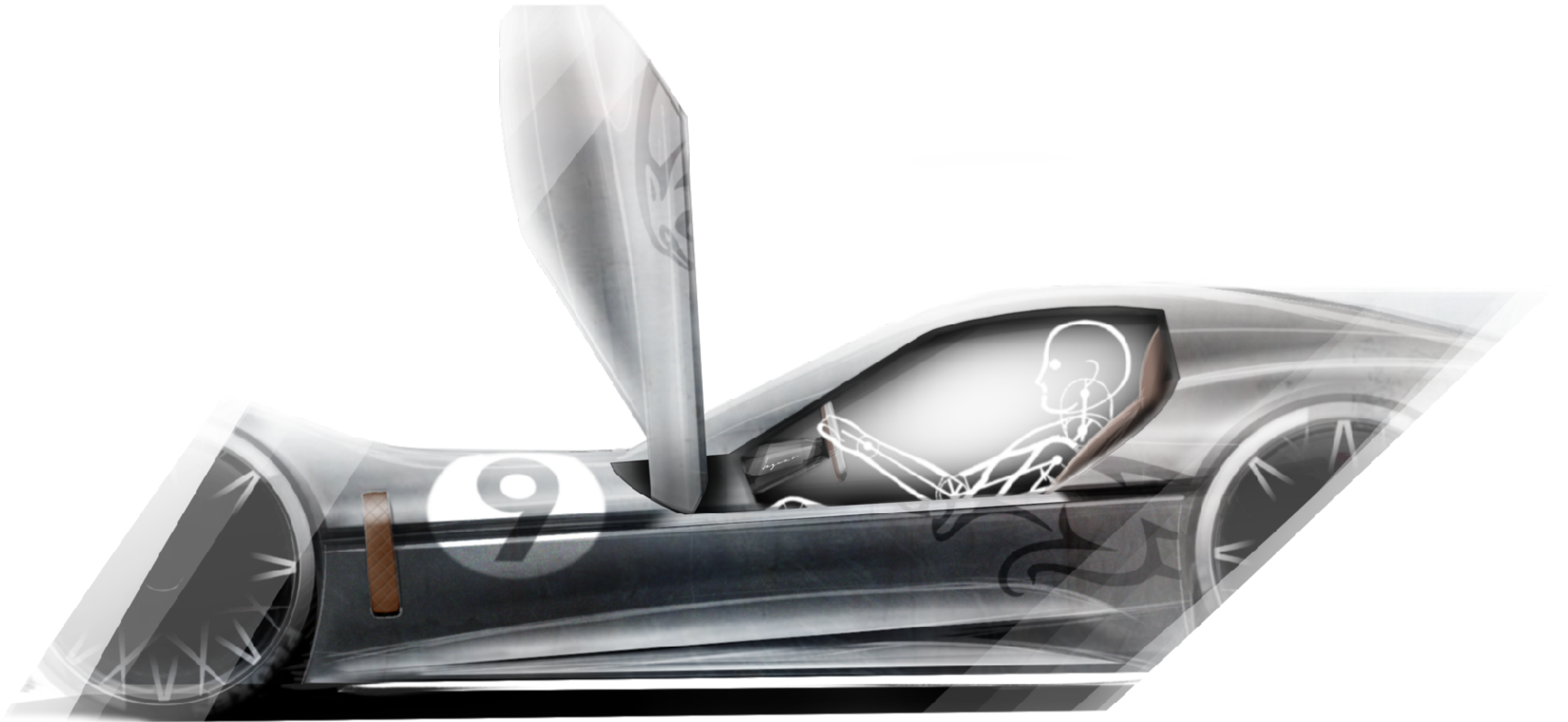
ECO-FRENDLY MATERIALS

BREATHABLE SEATS

3D PRINTED
SUPER LIGHT WEIGHT
INTERIOR

JAGUAR LOGO

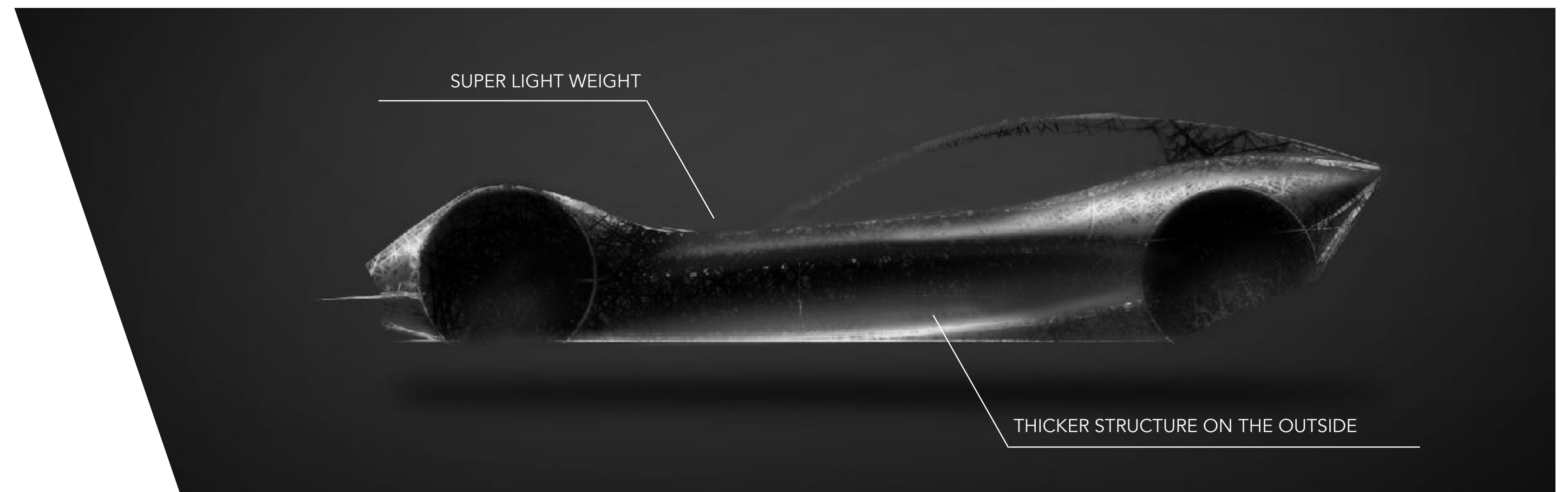
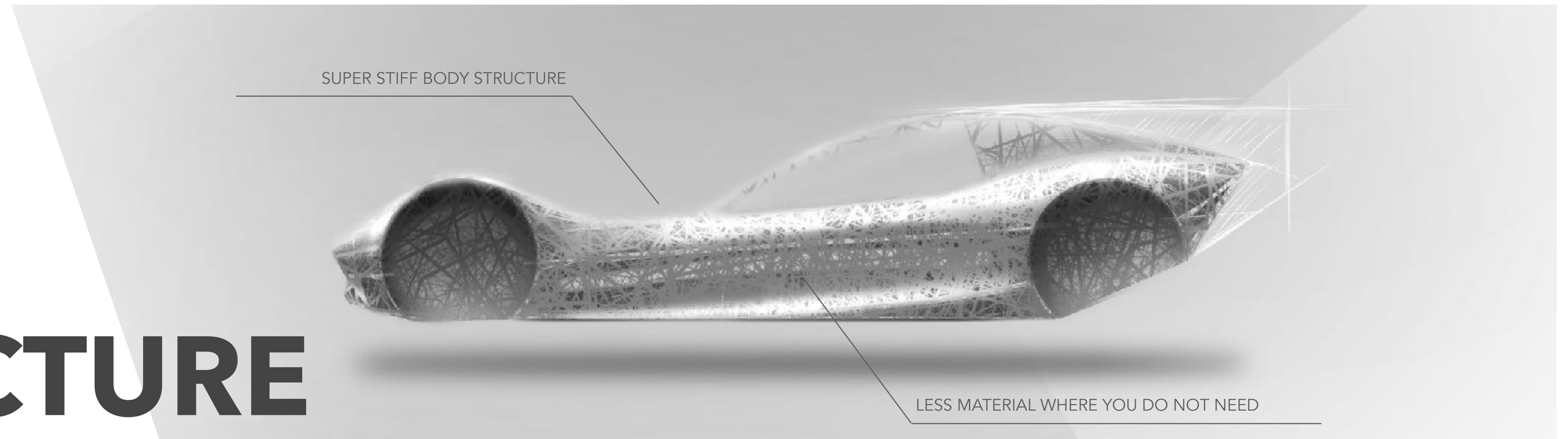
TRUNK



5.5 BODY STRUCTURE

Evolved lattice body structure
3.5 times lighter structure and also a lot stronger.

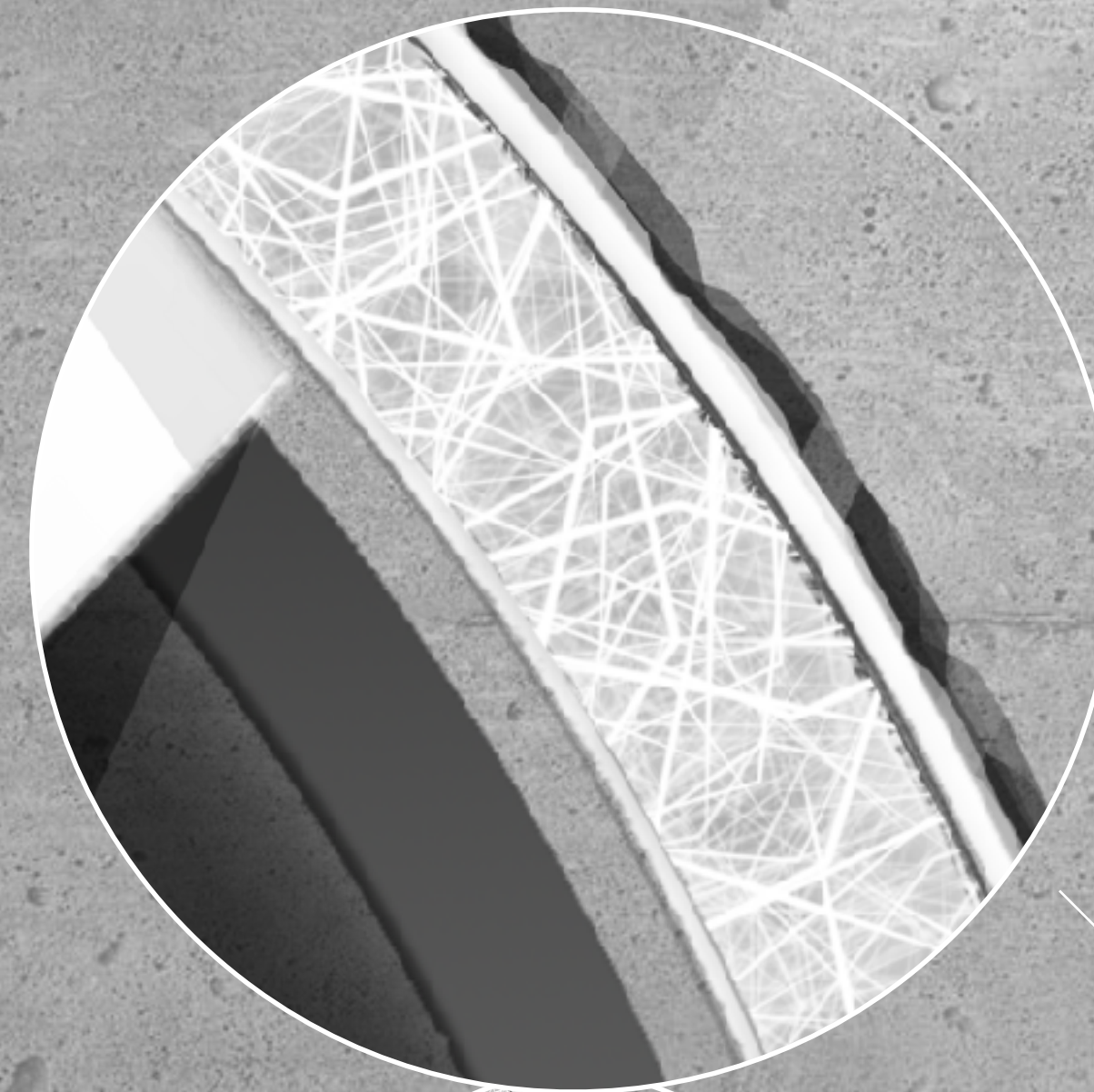
Car whole body is 3D printed of aluminium and also a lot more details and parts like wheels and tires.



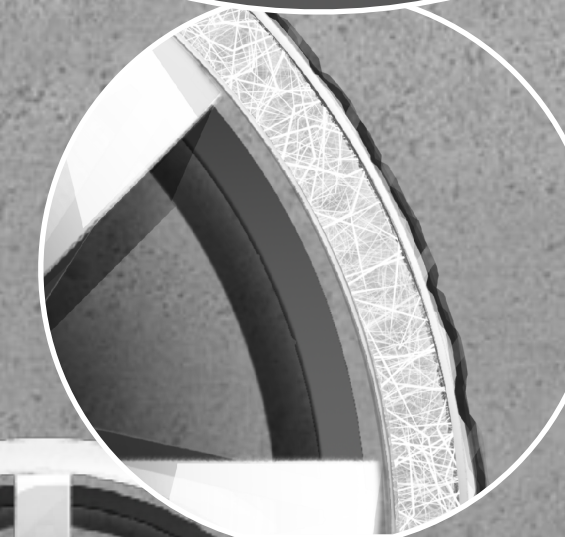
5.6 WHEEL DESIGN



RIM DESIGN

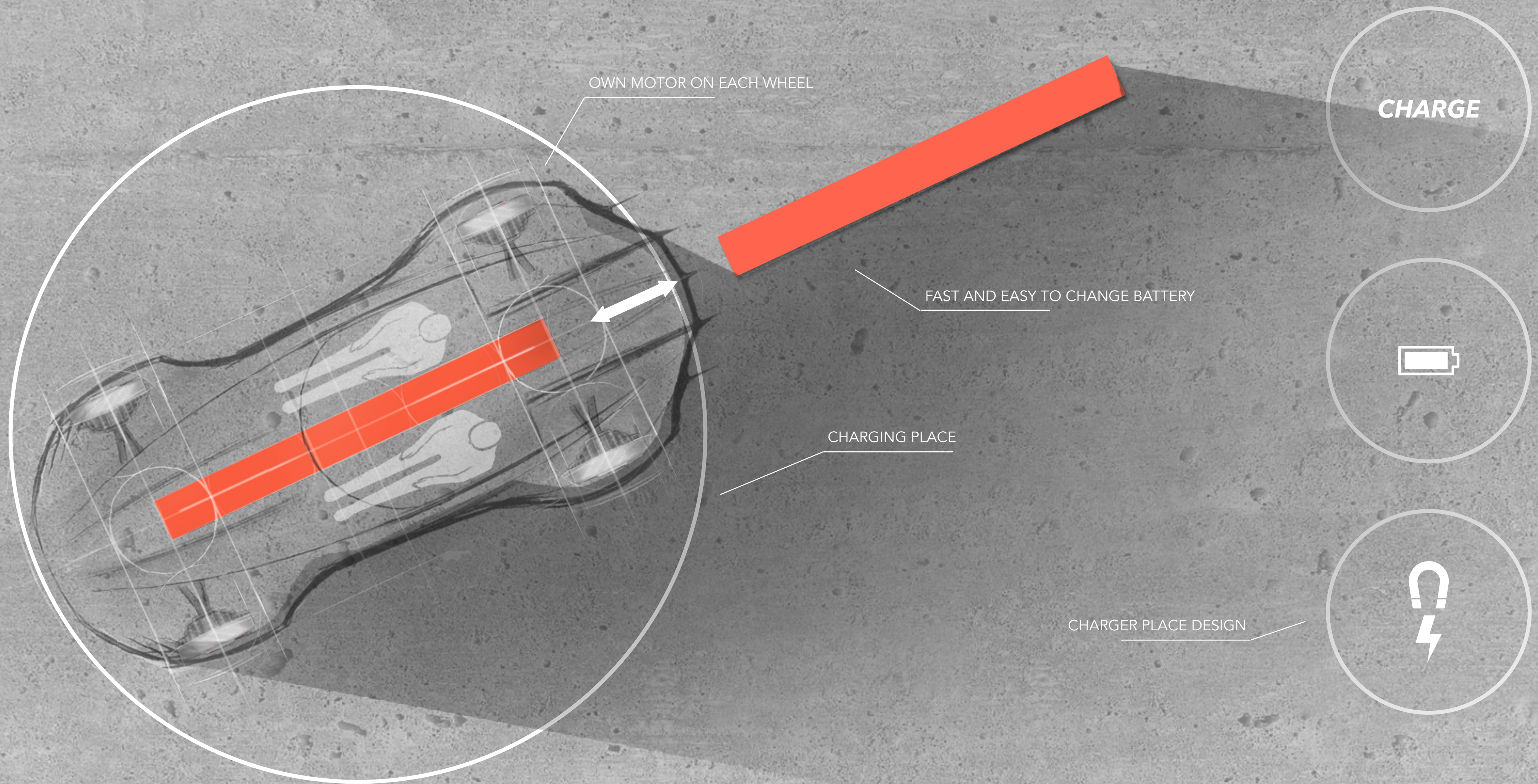


3D PRINTED SUPER
LIGHTWEIGHT AIRLESS TIRE
3D PRINTER PRODUCE NEW TIRES
EVERY TIME WHEN YOU NEED



CAN BE PRODUCED HARD TIRES
FOR THE ROAD AND SOFT TIRES
FOR THE TRACK

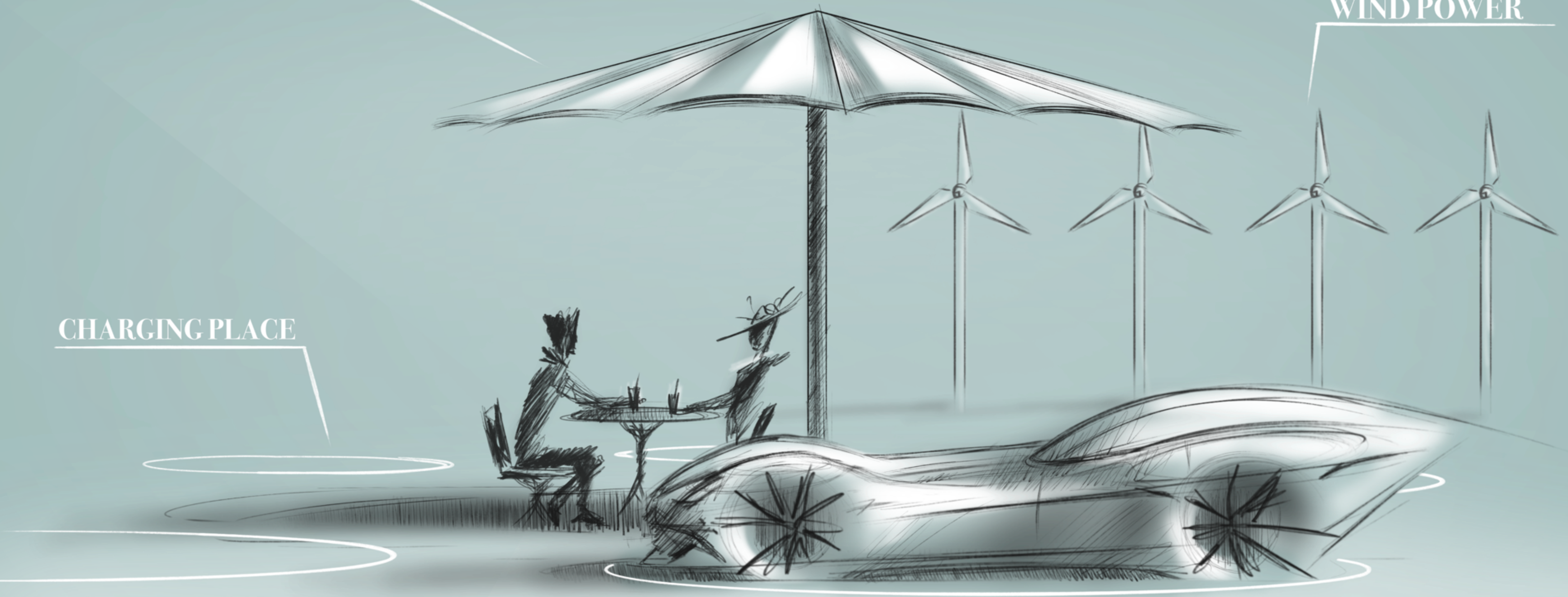




SOLAR PANELS

WIND POWER

CHARGING PLACE



Ideation of a charging

5.7 CLAY MODEL

I have done 1:10 clay model of a Jaguar D-type in the previous course which helps me to understand the Jaguar's design language.

Clay modeling was one of the greatest and hardest things of the thesis project.

Clay model helps me to get right shapes on renders and with this model, it is easy to outline the final result.

I'm really proud of the result and I start to love car modeling, it is one of best things which vehicle designers need to experience.

© Pictures: Ivo Mikkulainen, 2018



DAY 1-4

Printed dimensions in 1:5 scale. This easy part still takes a whole day. Mock-up of base did not even work at the first time, so I did another one. First layers of clay. I really love to create with my own hands and this was fun.



DAY 5-8

From the fifth day the clay model starts to get right shapes.

DAY 9-

Design start to look right like my sketches. I added some details.

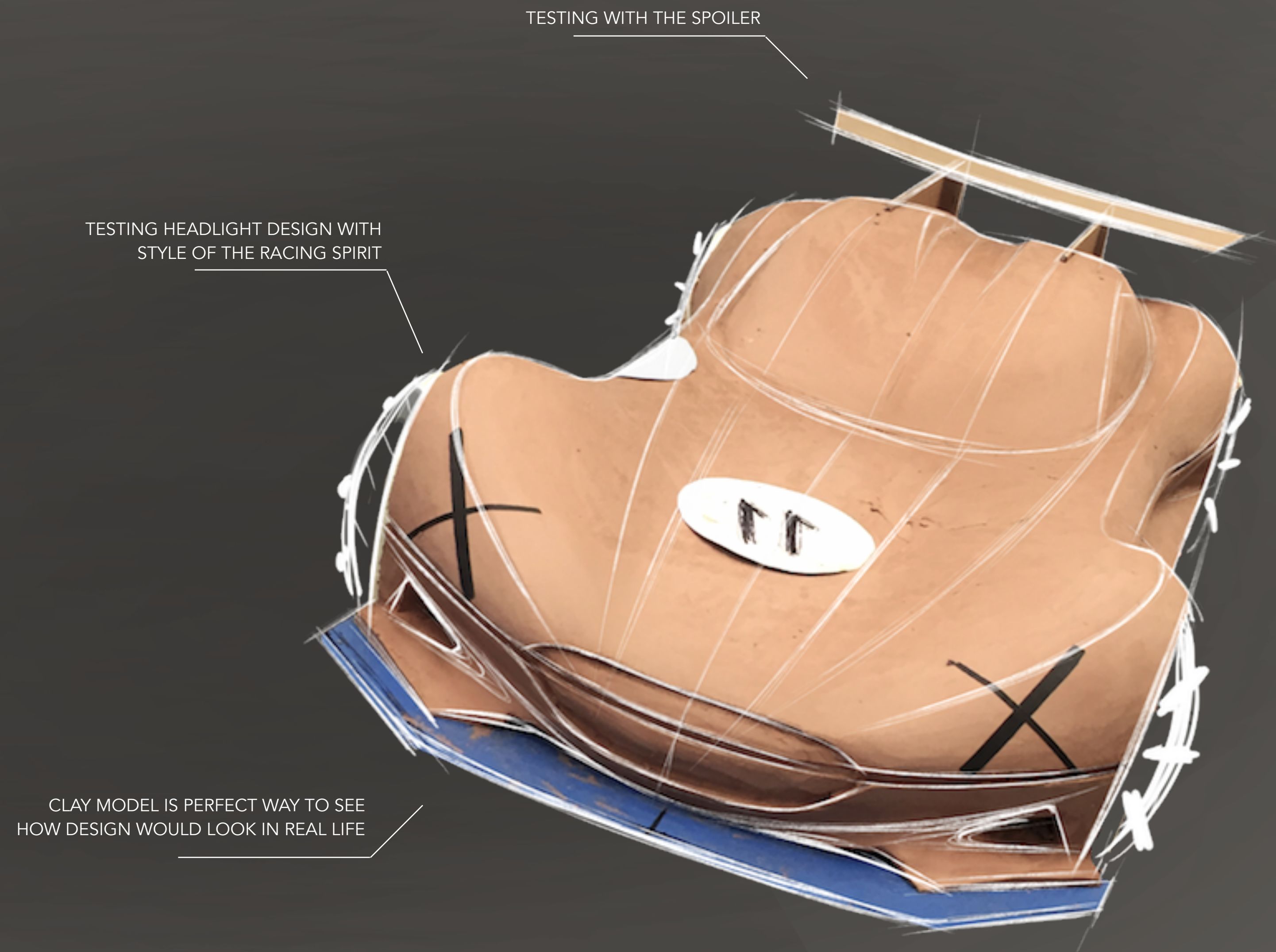


TO BE CONTINUE

Will be ready for the STANCE exhibition day.

With the clay model was a nice to test details and see how they look.

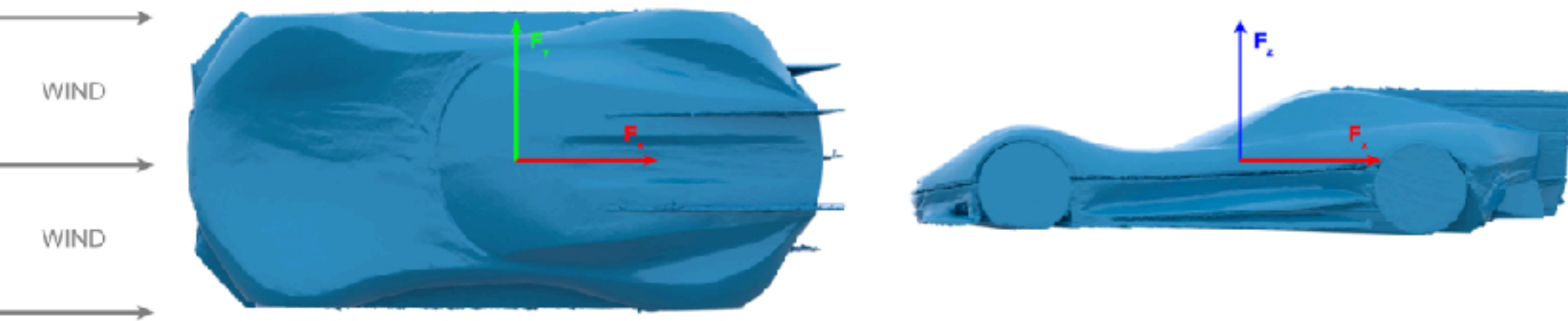
The clay model was one of the hardest parts but still really fun and interesting.



5.8 AERODYNAMIC SIMULATION

With AirShaper aerodynamic simulation we tested on 3D scanned incomplete clay model to see how airflow would look. This was my and my teacher’s first test of this aerodynamic simulation and the first 3D scan of my clay model. Considering that no air intakes and air outtakes have been made in this test still, the result was positive and interesting. In pictures you can see the result.

FORCES



	F_x	F_y	F_z
Pressure	1375.979 N (140.263 kg)	-152.2565 N (-15.521 kg)	-1490.93 N (-151.981 kg)
Friction	83.10078 N (8.471 kg)	0.5852162 N (0.060 kg)	0.8673847 N (0.088 kg)
Total	1459.07978 N (148.734 kg)	-151.6712838 N (-15.461 kg)	-1490.0626153 N (-151.892 kg)

DRAG COEFFICIENT

The drag coefficient is a dimensionless quantity that indicates the aerodynamic resistance of an object moving through the air. It is defined as follows:

$$C_d = \frac{2F_d}{\rho v^2 A}$$

The scale below illustrates typical Cd values (NASA and Wikipedia). More streamlined objects will have a low Cd, less streamlined objects will have a high Cd. The Cd of your project has been indicated as well. Please note that this is an indicative figure, mainly suited for comparing different concepts. For a highly accurate value, contact us at info@airshaper.com.

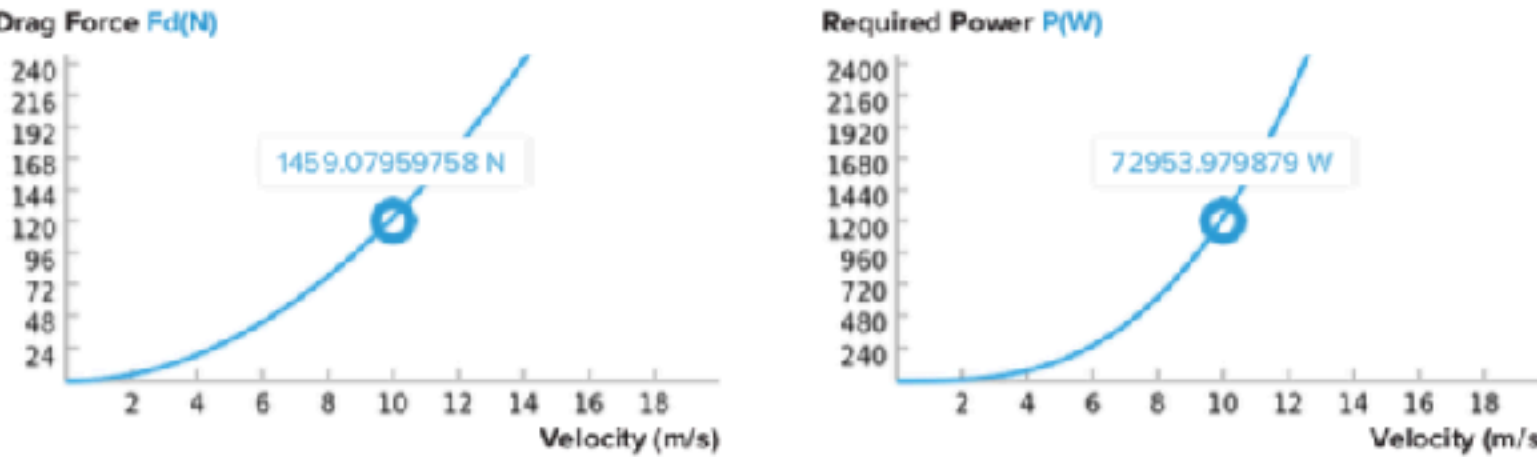


DRAG COEFFICIENT

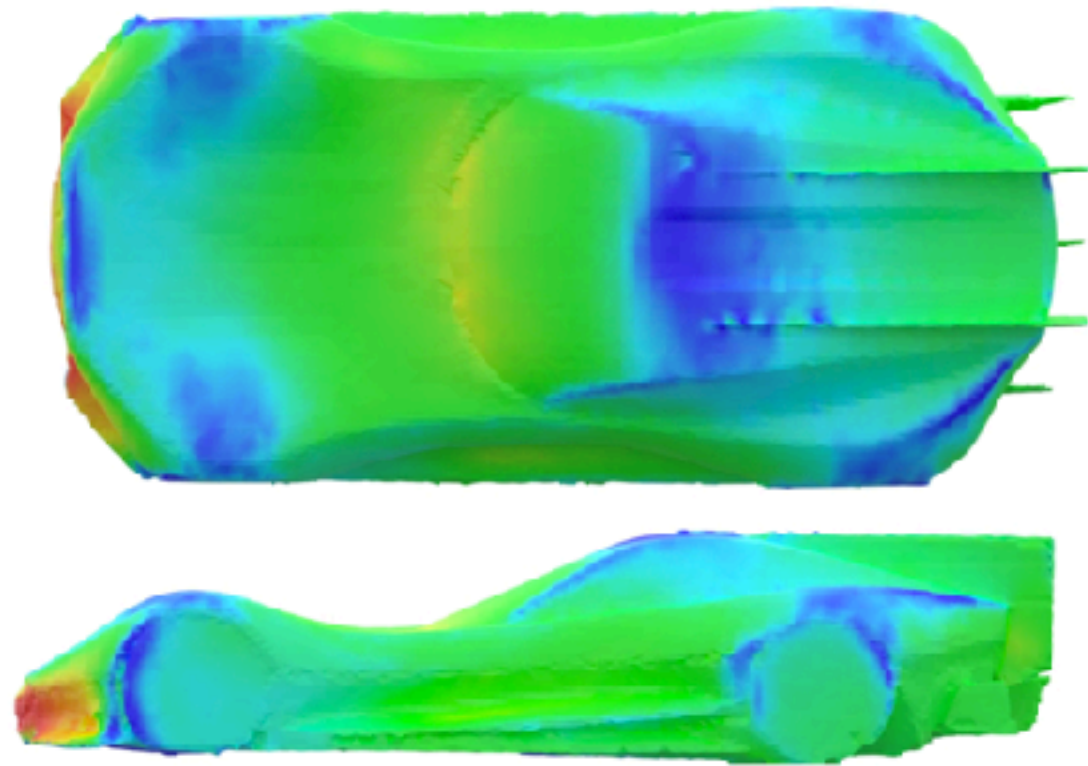
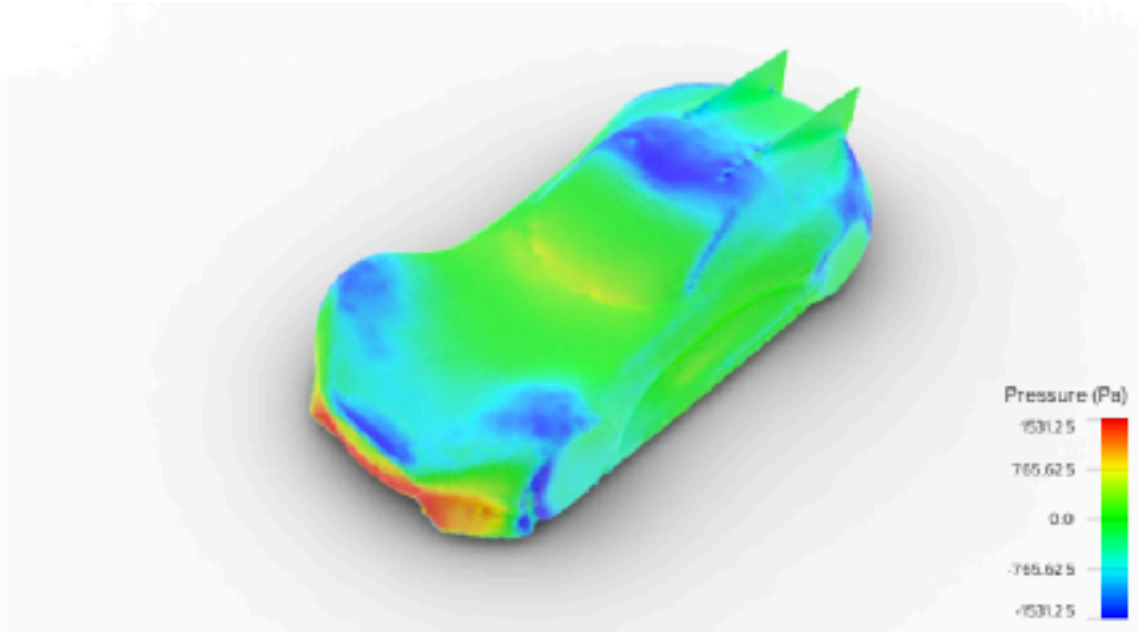
The Cd provides a measure for the aerodynamic efficiency of an object. By approximation, the actual drag force Fd on the object as well as the power required to propel it will vary in function of the wind speed according the following formula:

$$F_d = \frac{\rho v^2 C_d A}{2} \quad P = F_d v$$

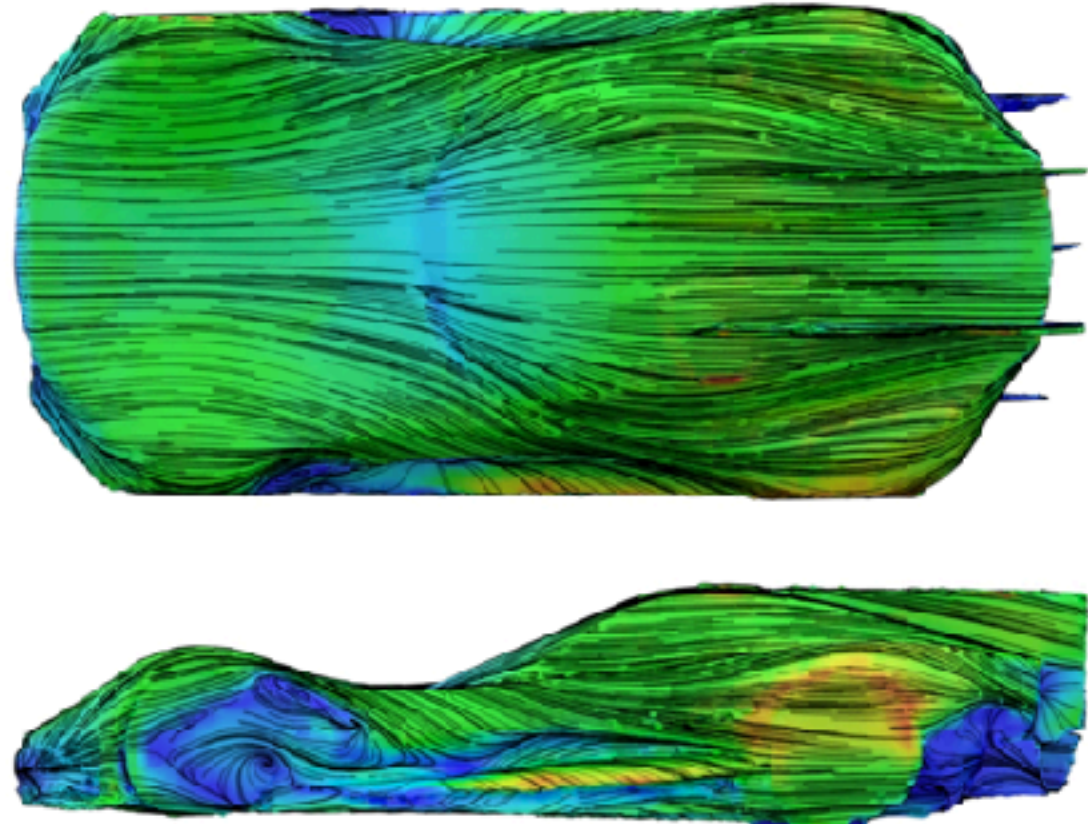
For your project, that leads to the force & power curves shown below. Please keep in mind that this curve is an estimation, based on extrapolation from the simulation wind speed. For more accurate forces at a given velocity, please perform a simulation for that velocity.



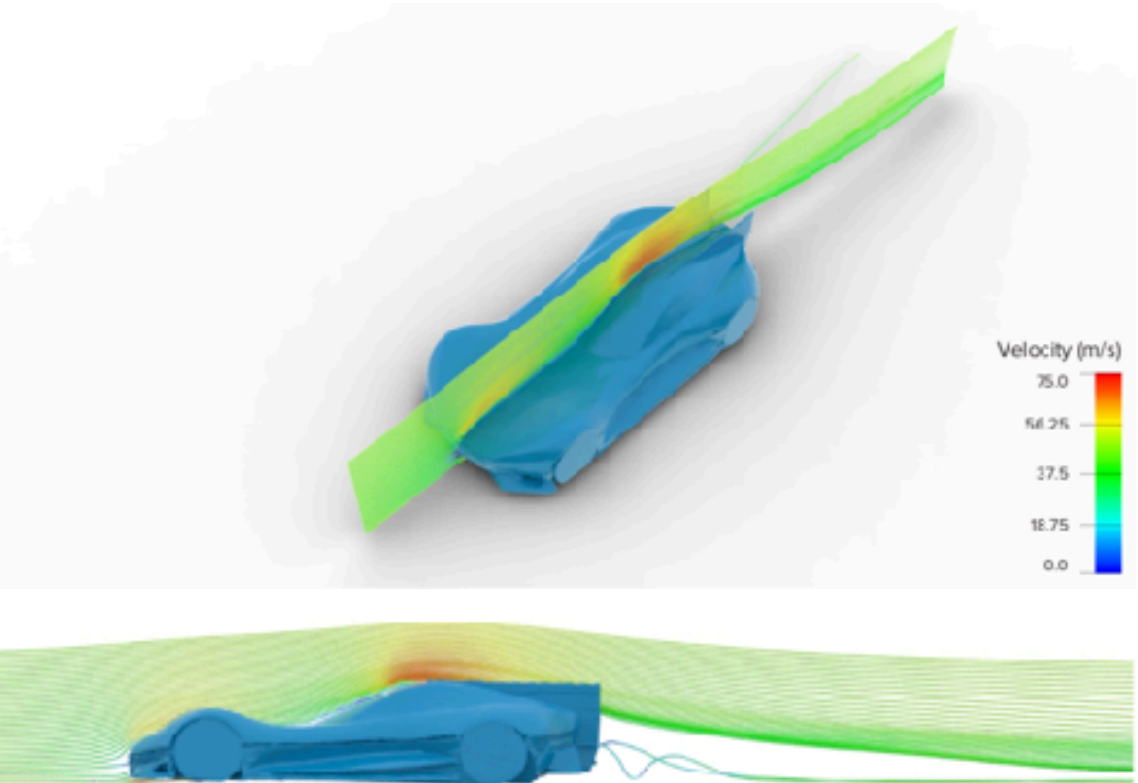
SOURCES OF DRAG - OVERPRESSURE



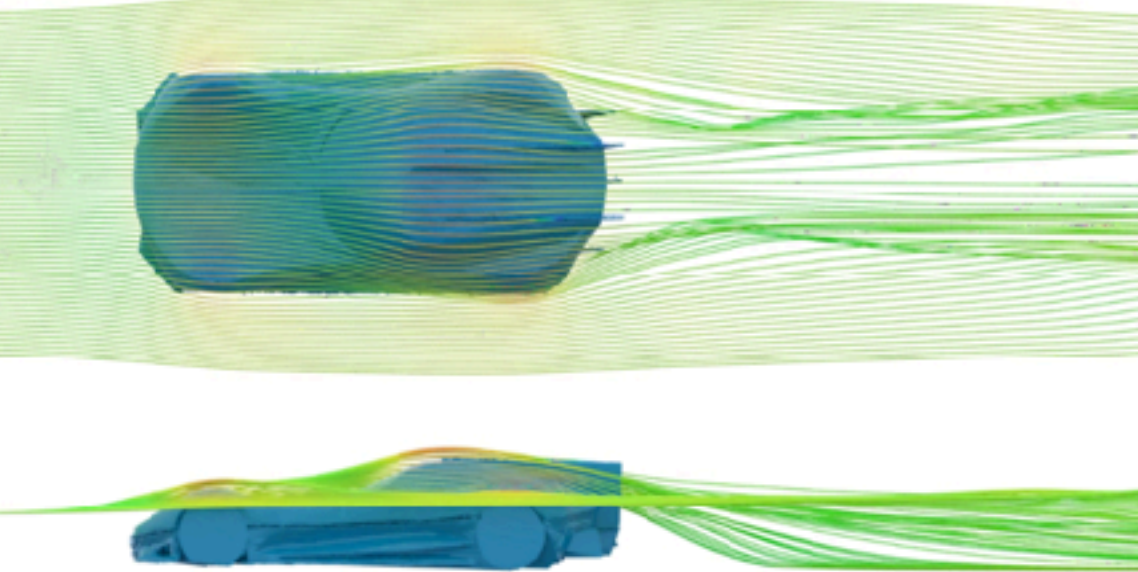
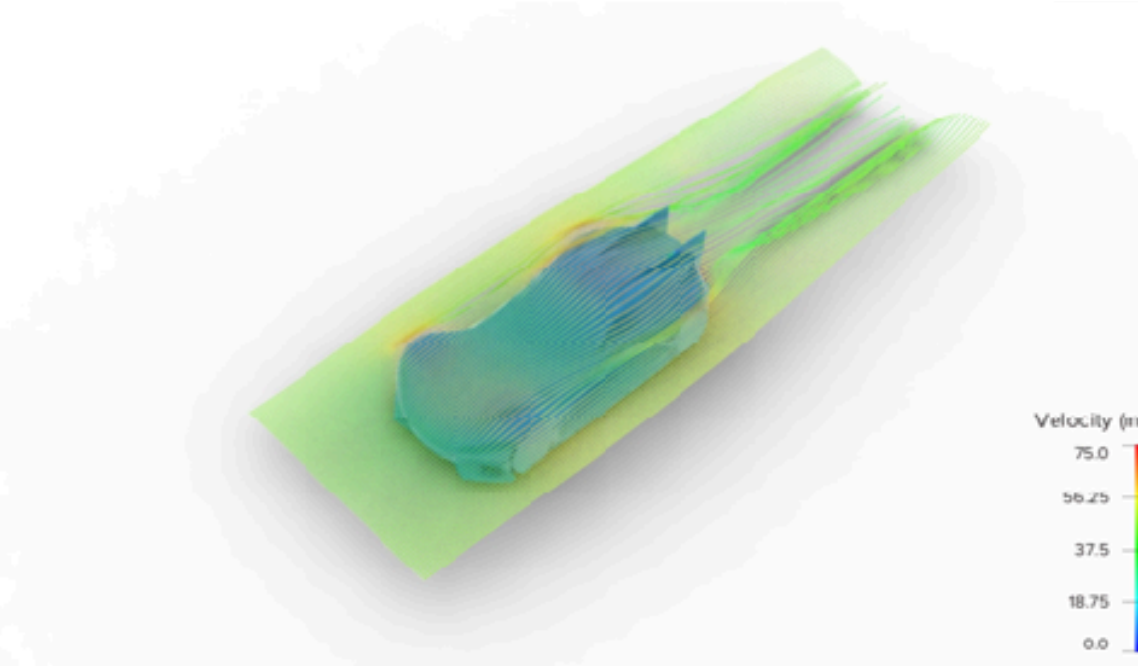
SOURCES OF DRAG - SURFACE FRICTION



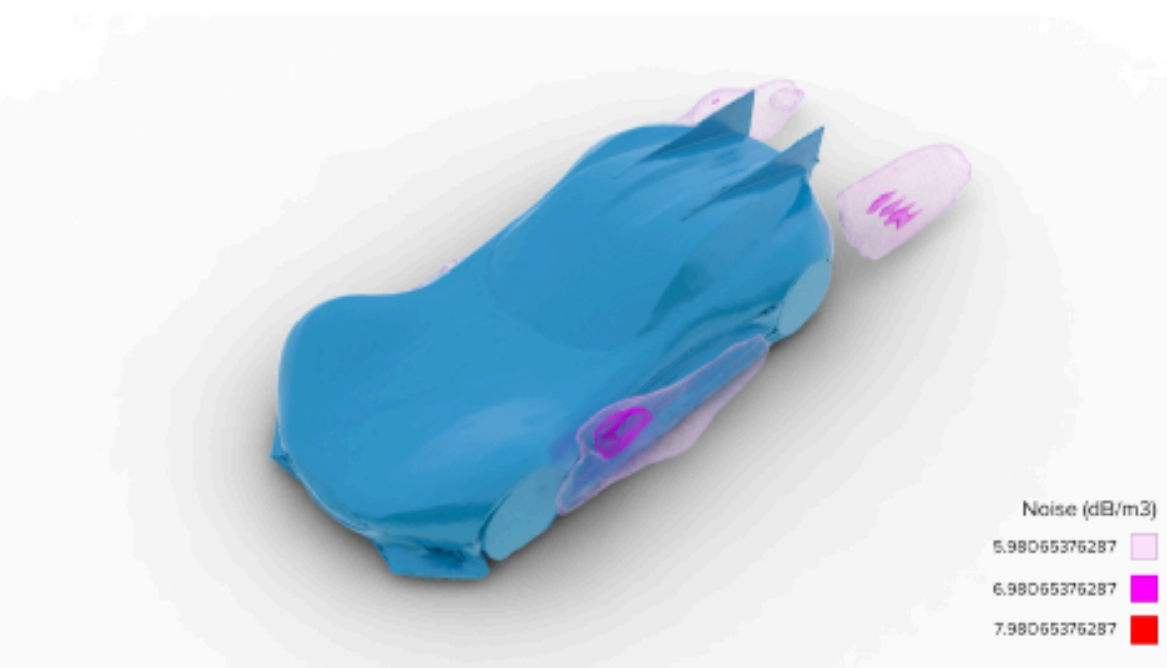
WIND FLOW - PATTERNS



HORIZONTAL SET OF TREAMLINES

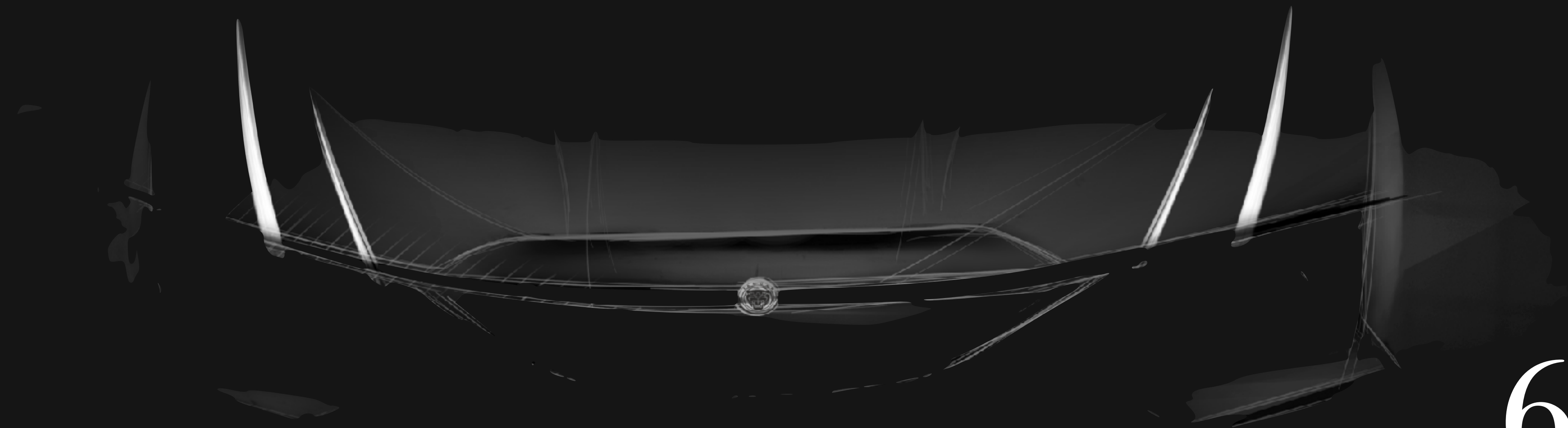


NOISE



SIMULATED IN OUR DIGITAL WINDTUNNEL AT
AIRSHAPER.COM

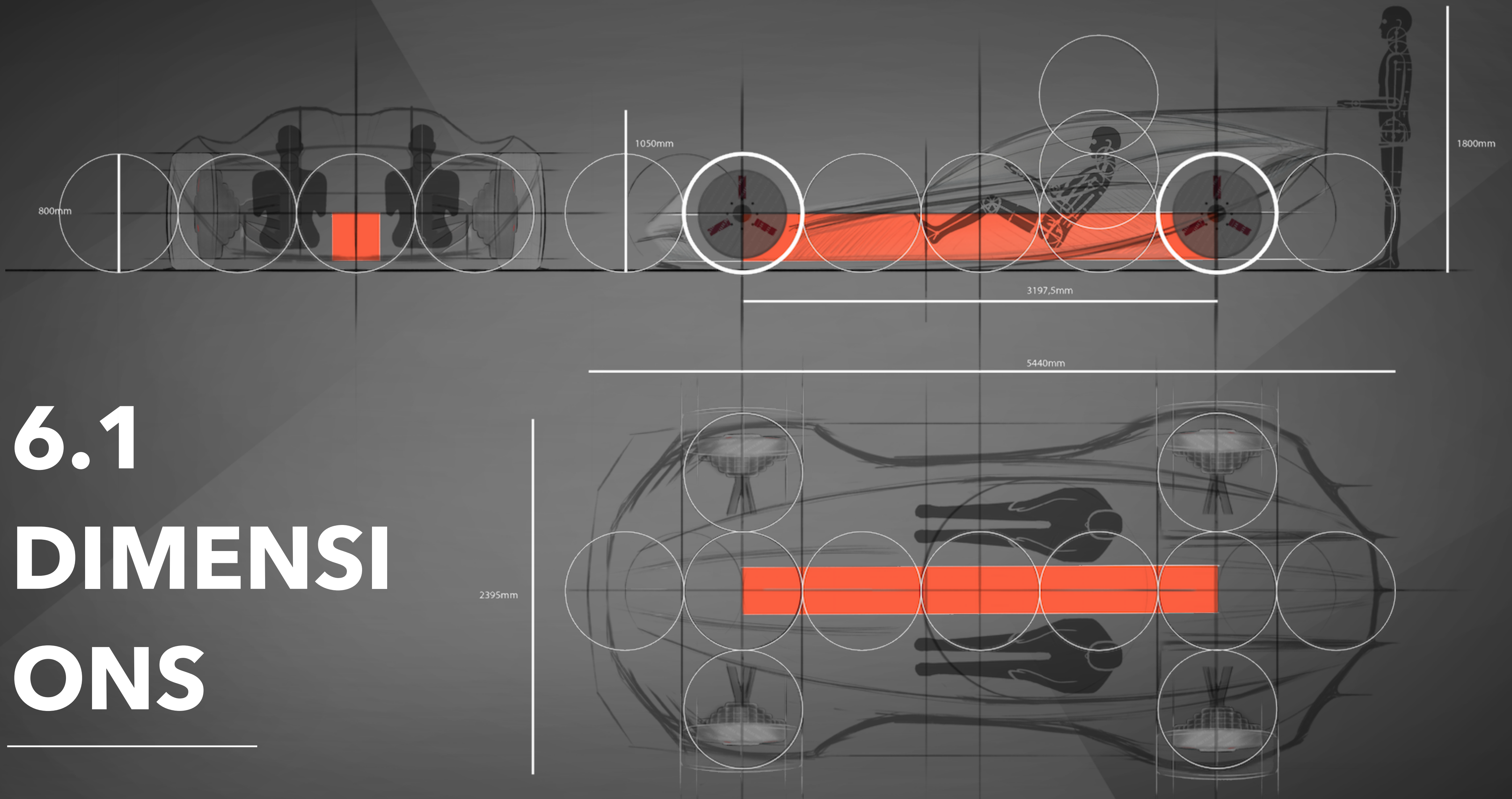




6.

RESULT

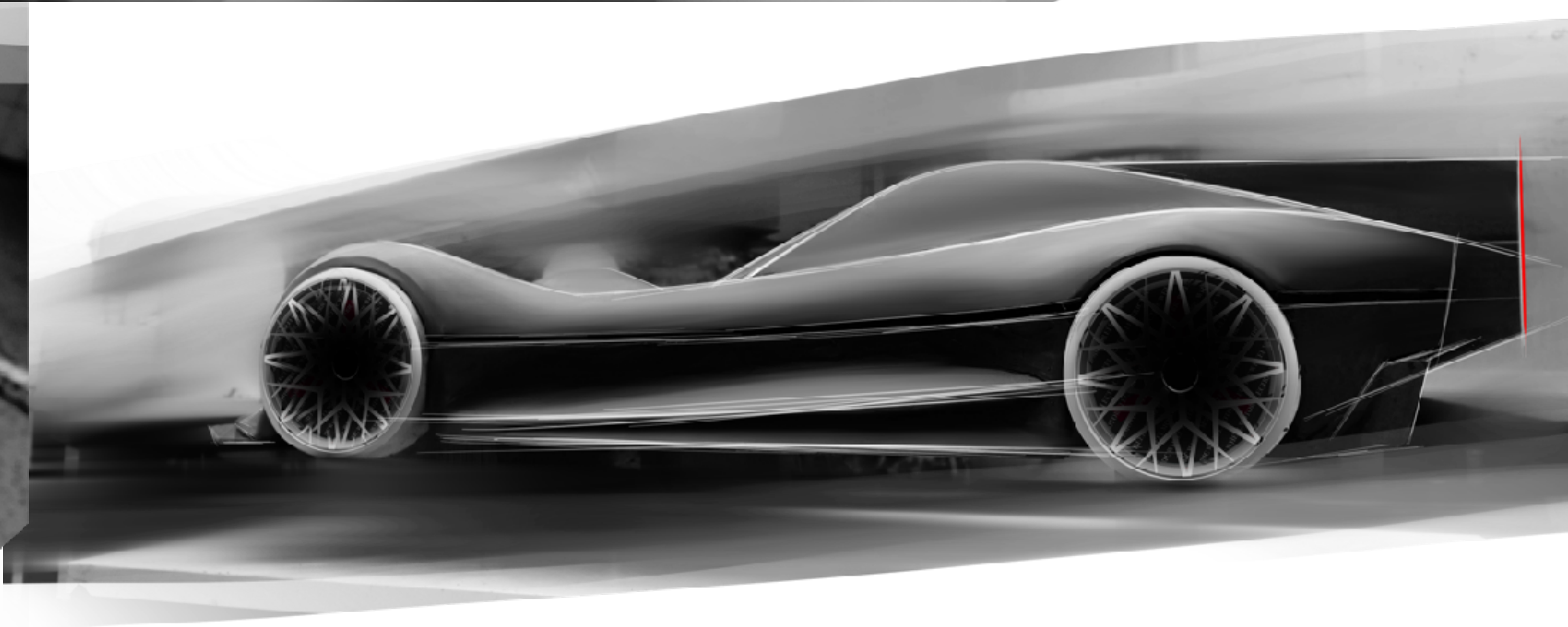
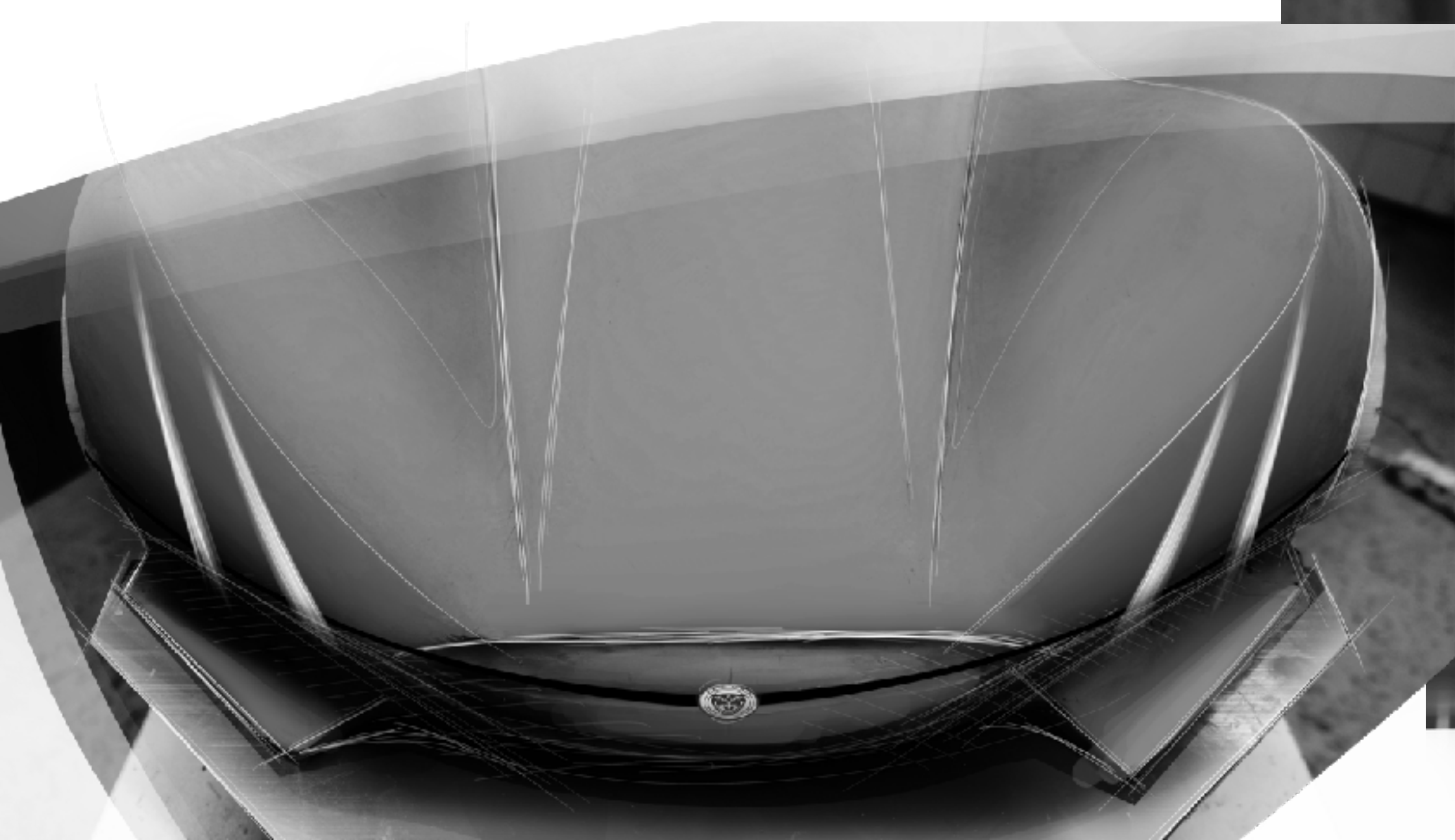
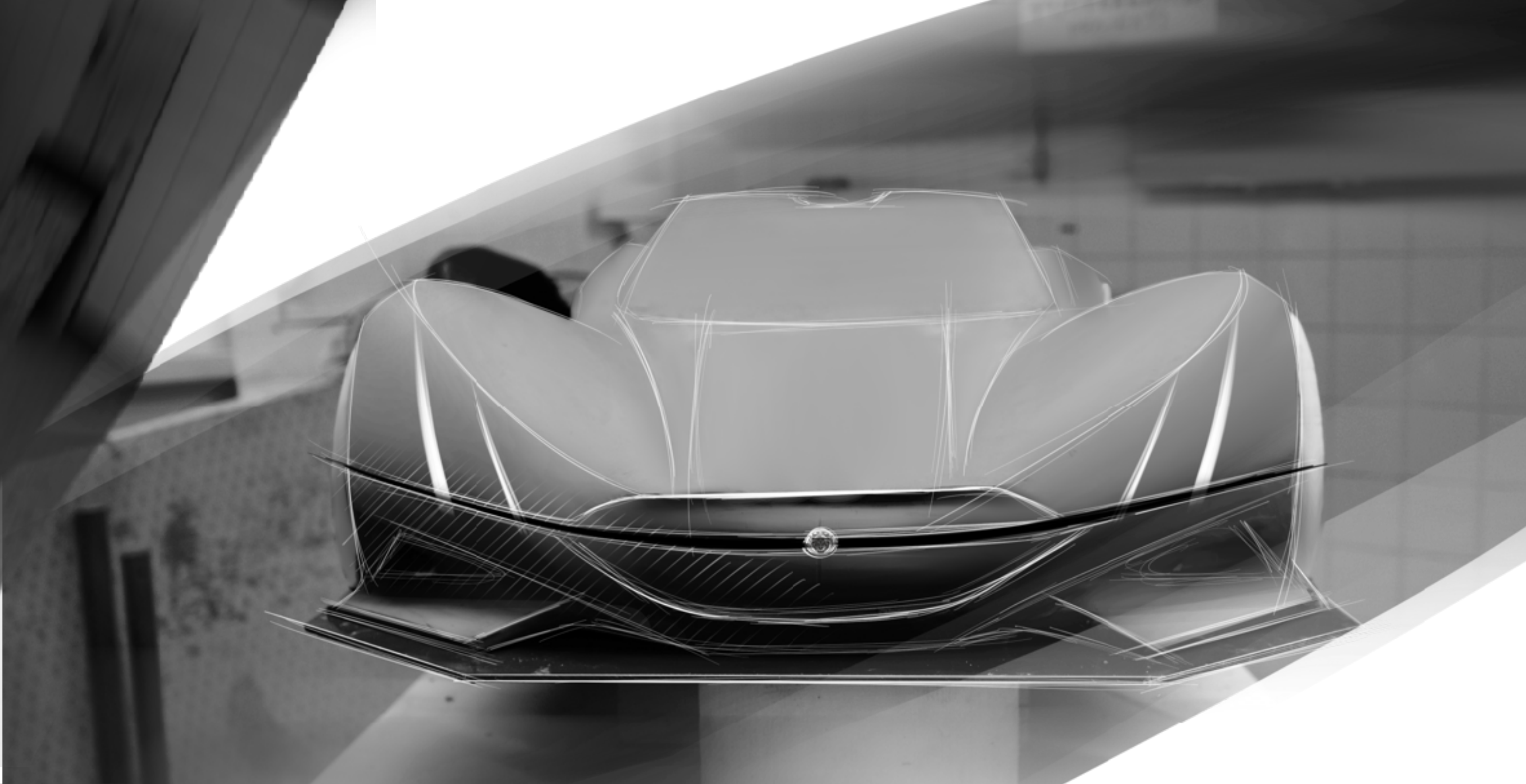
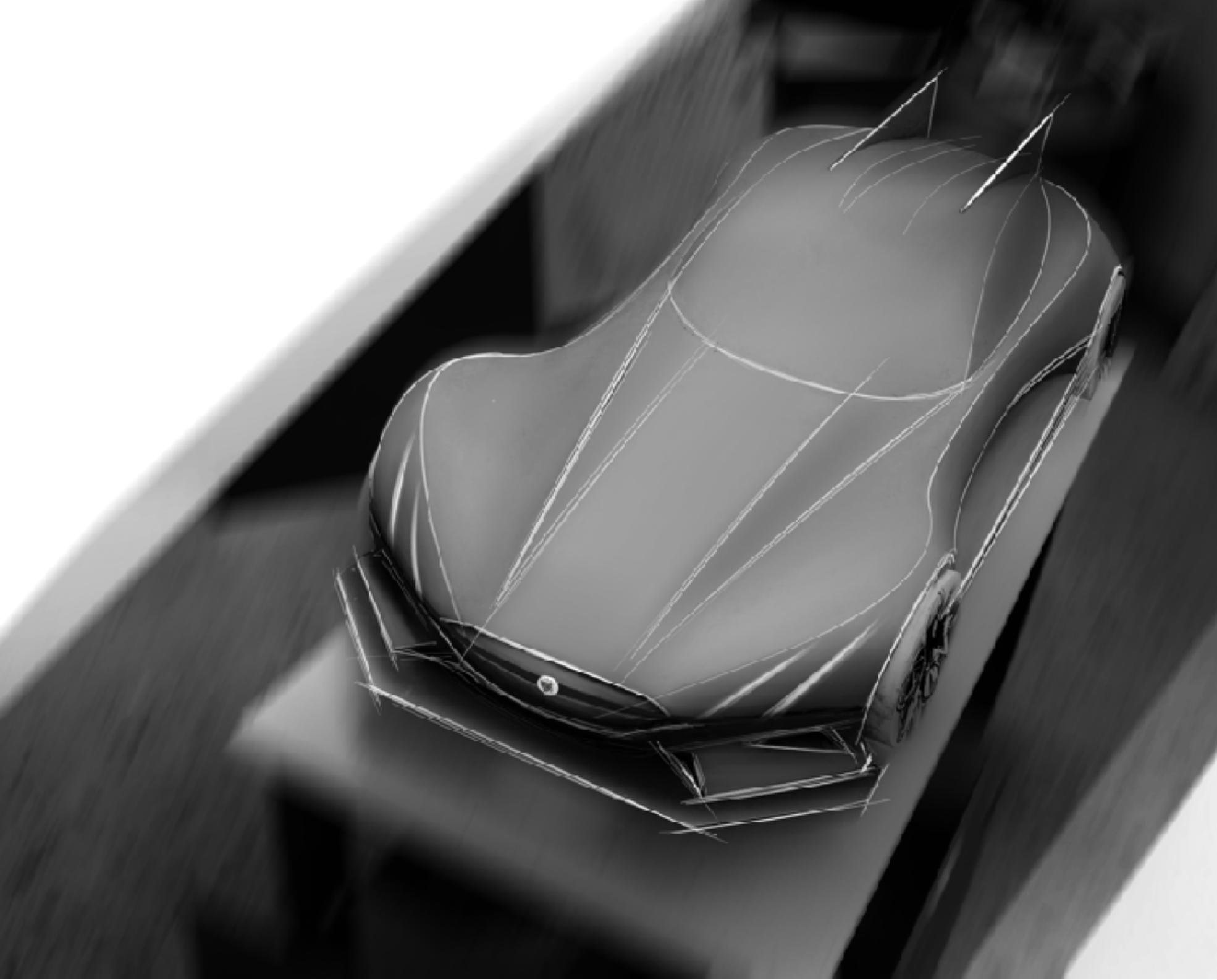
6.1 DIMENSI ONS

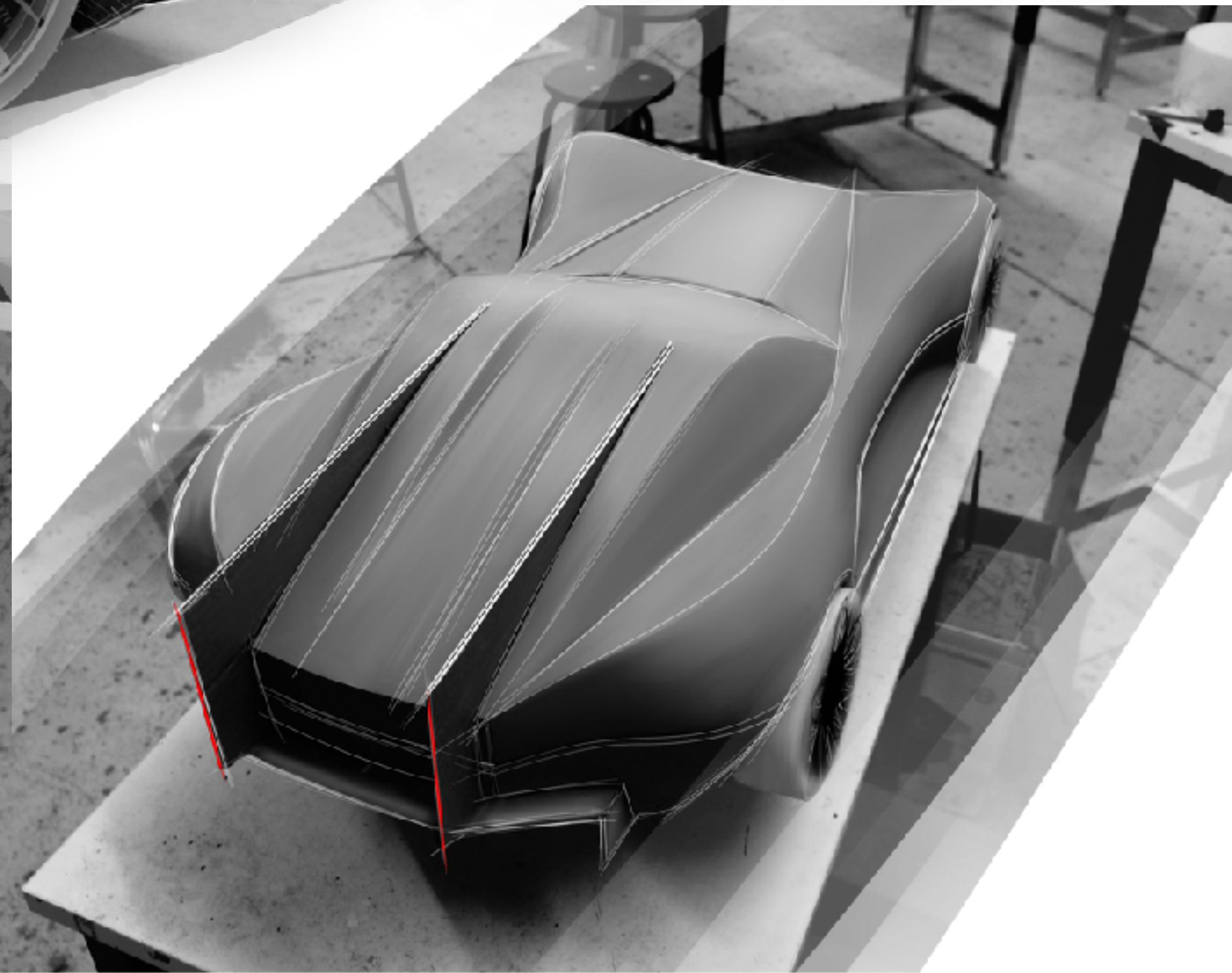
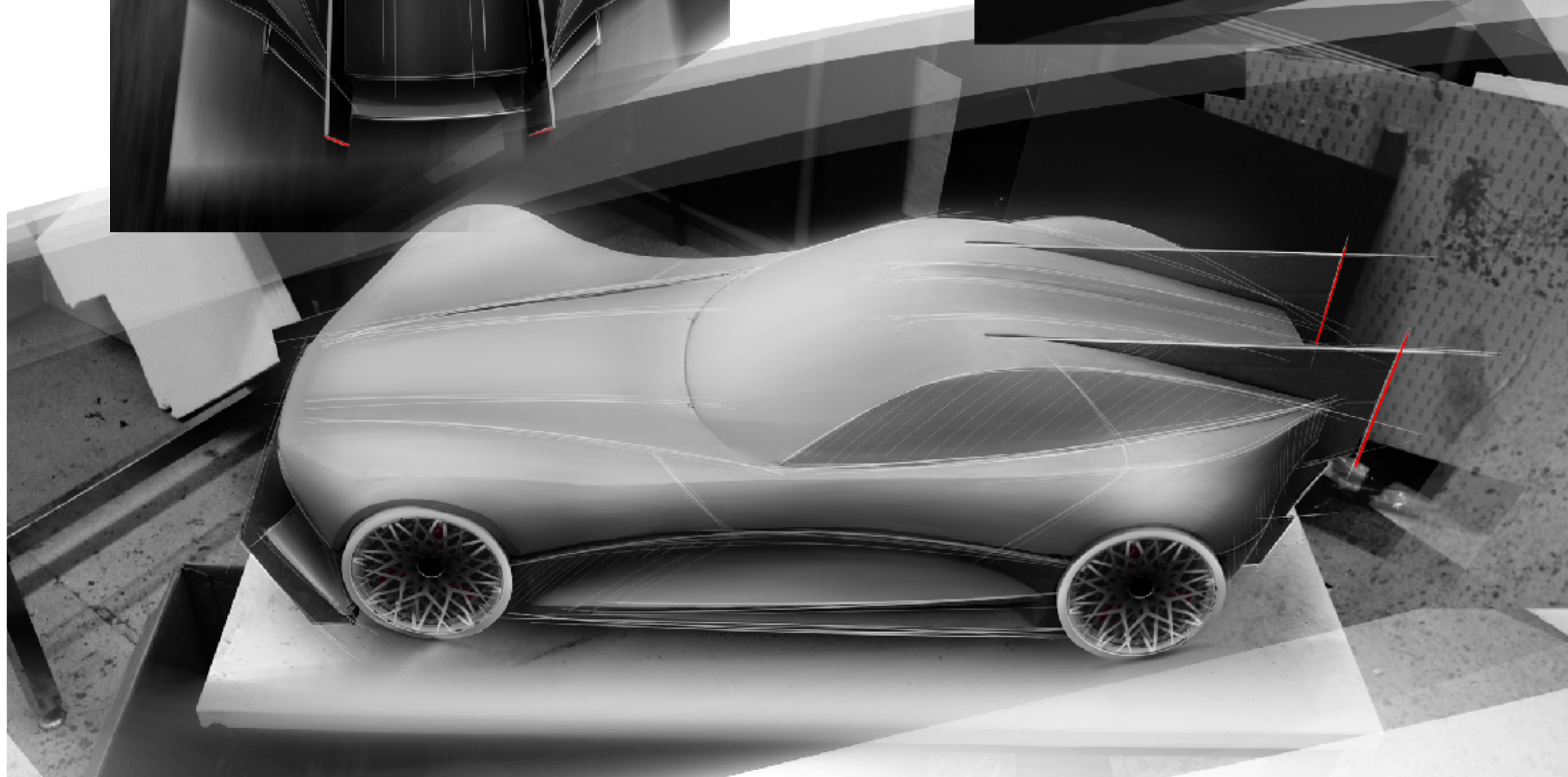


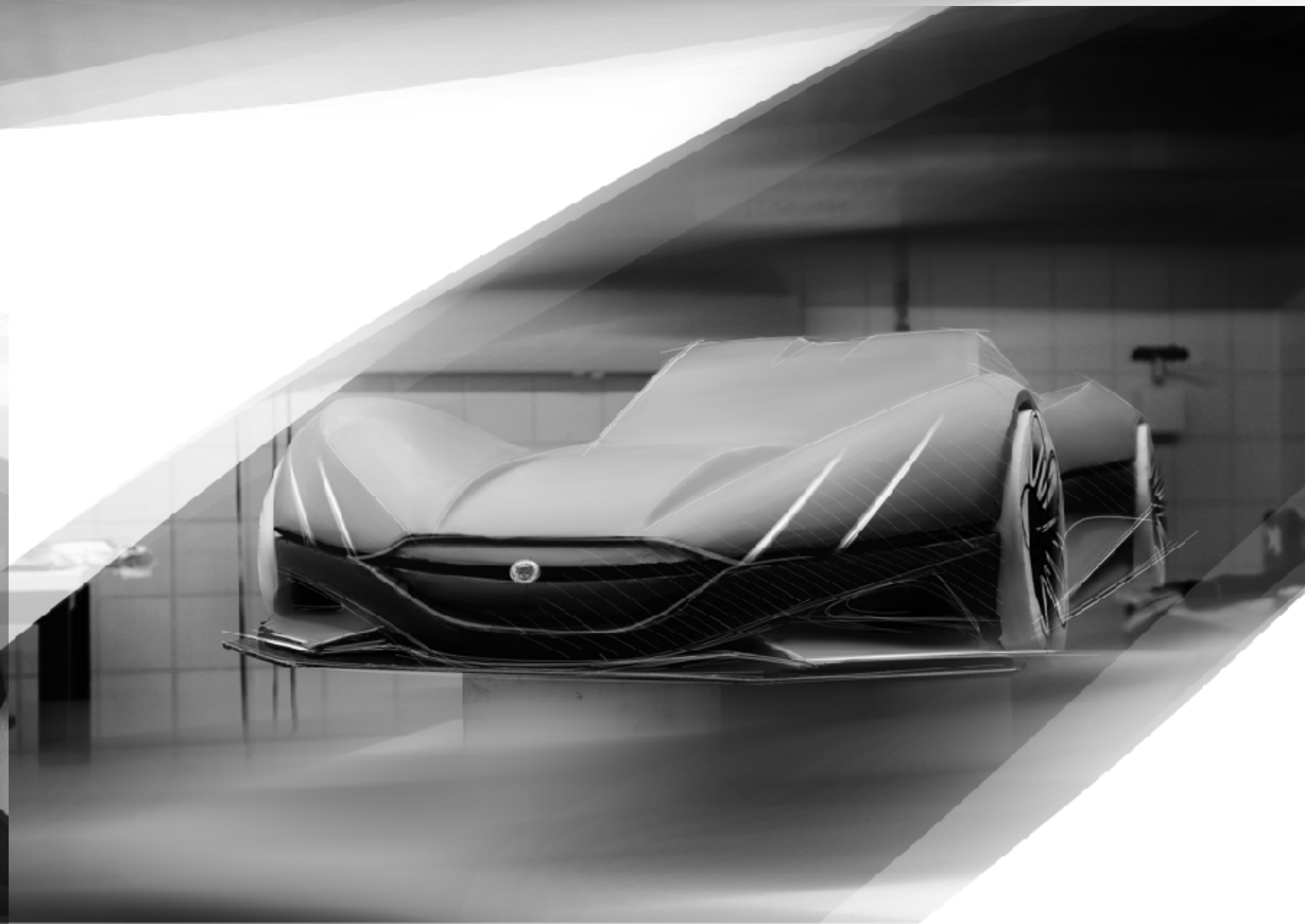
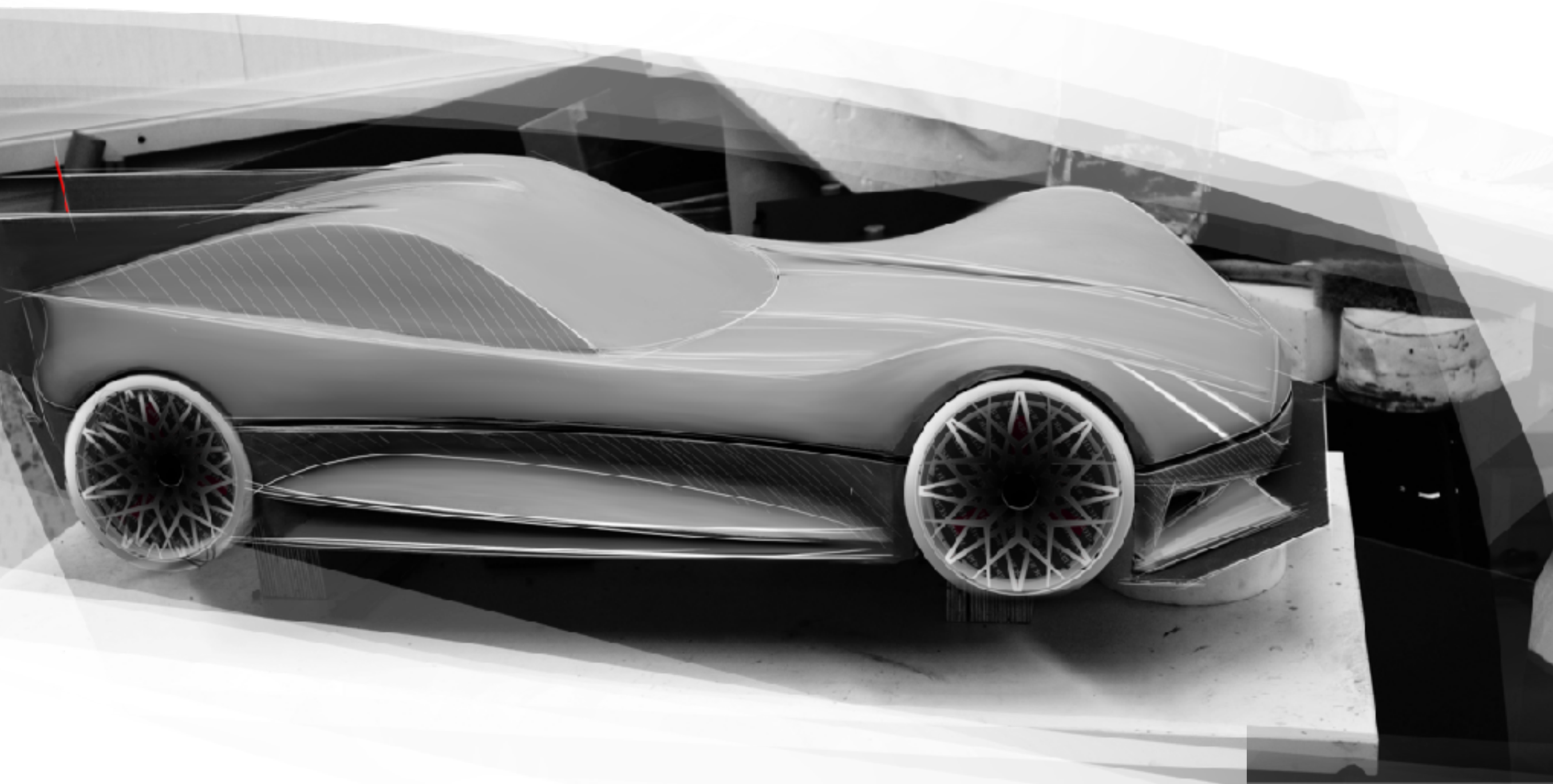
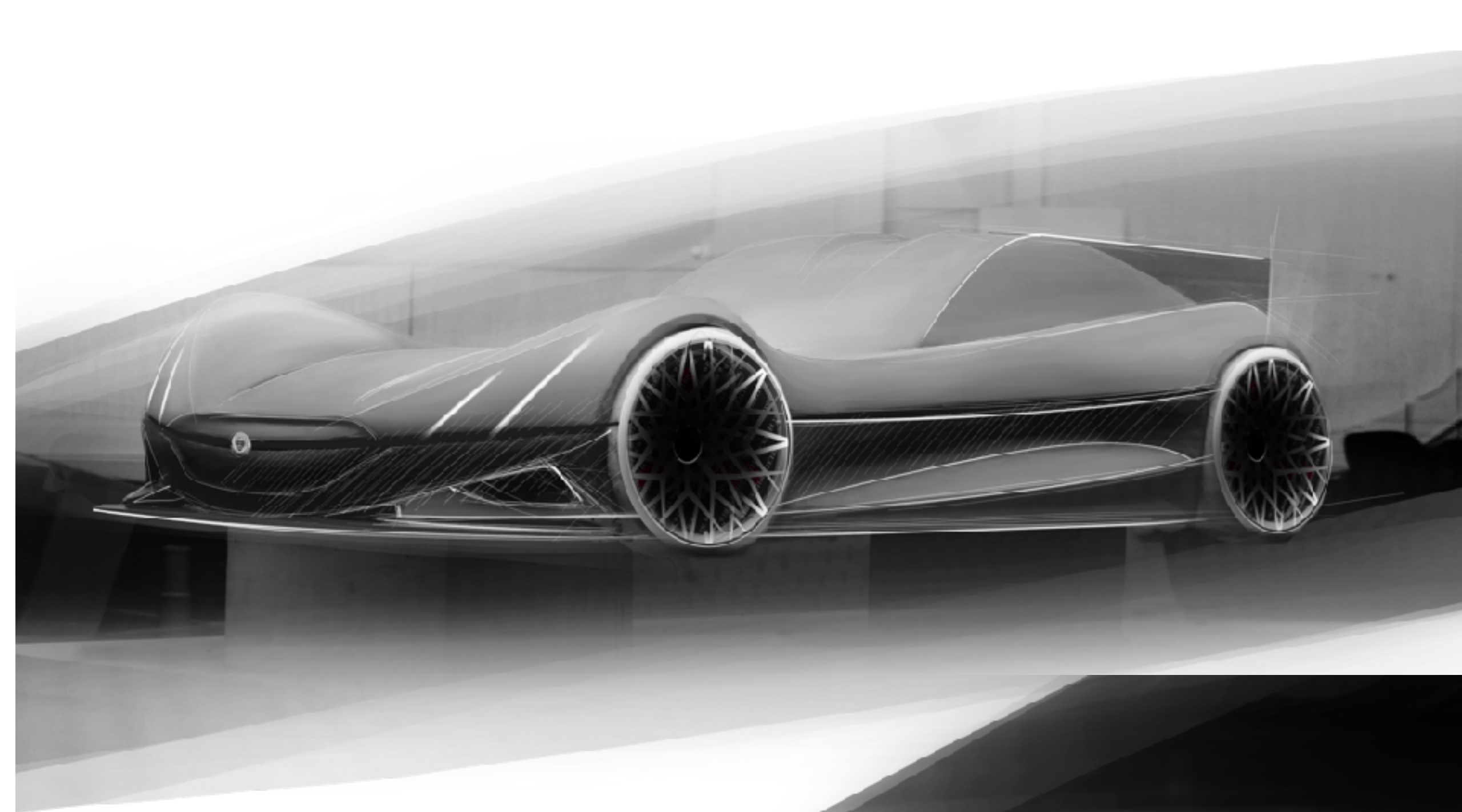
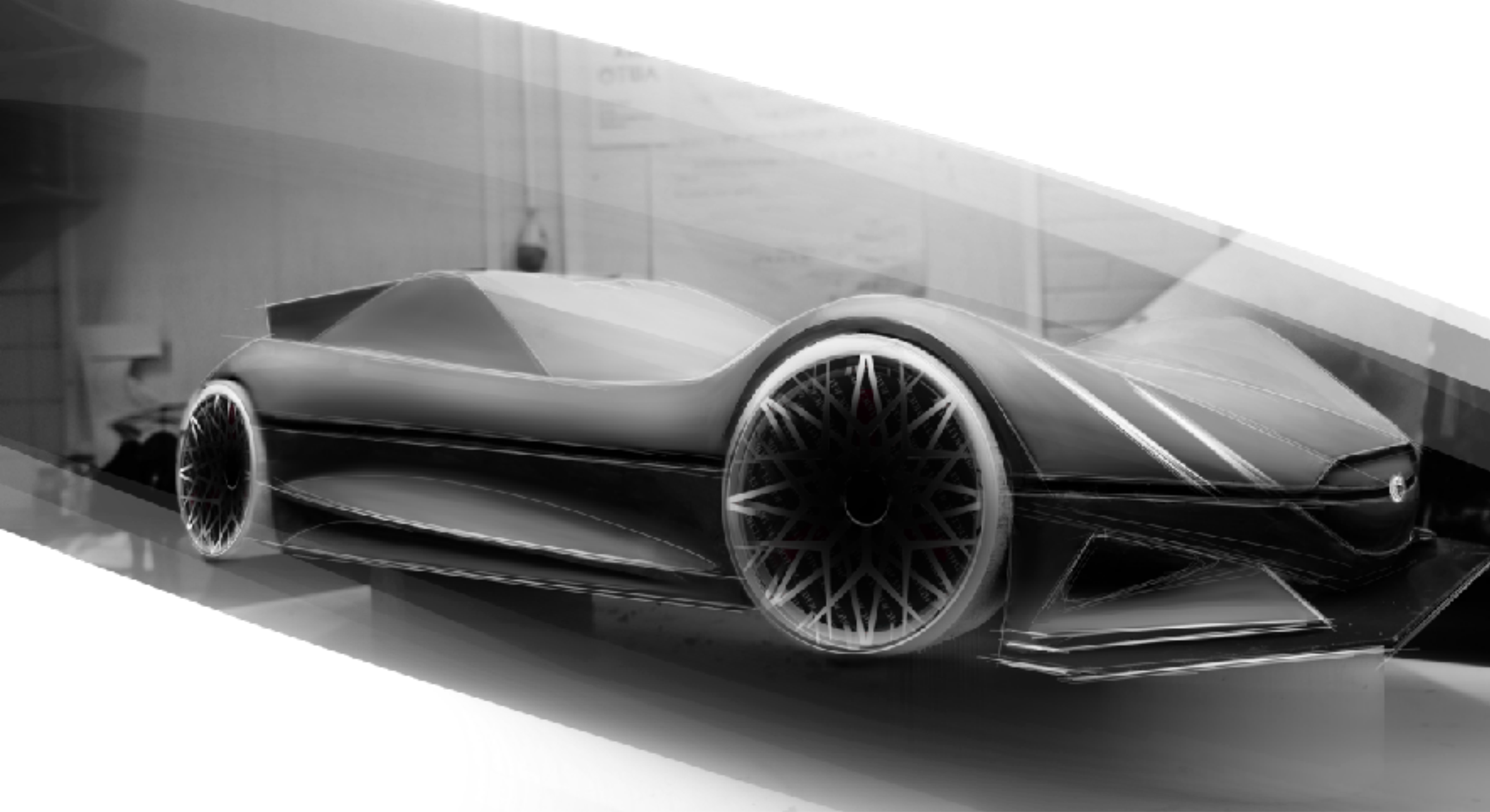


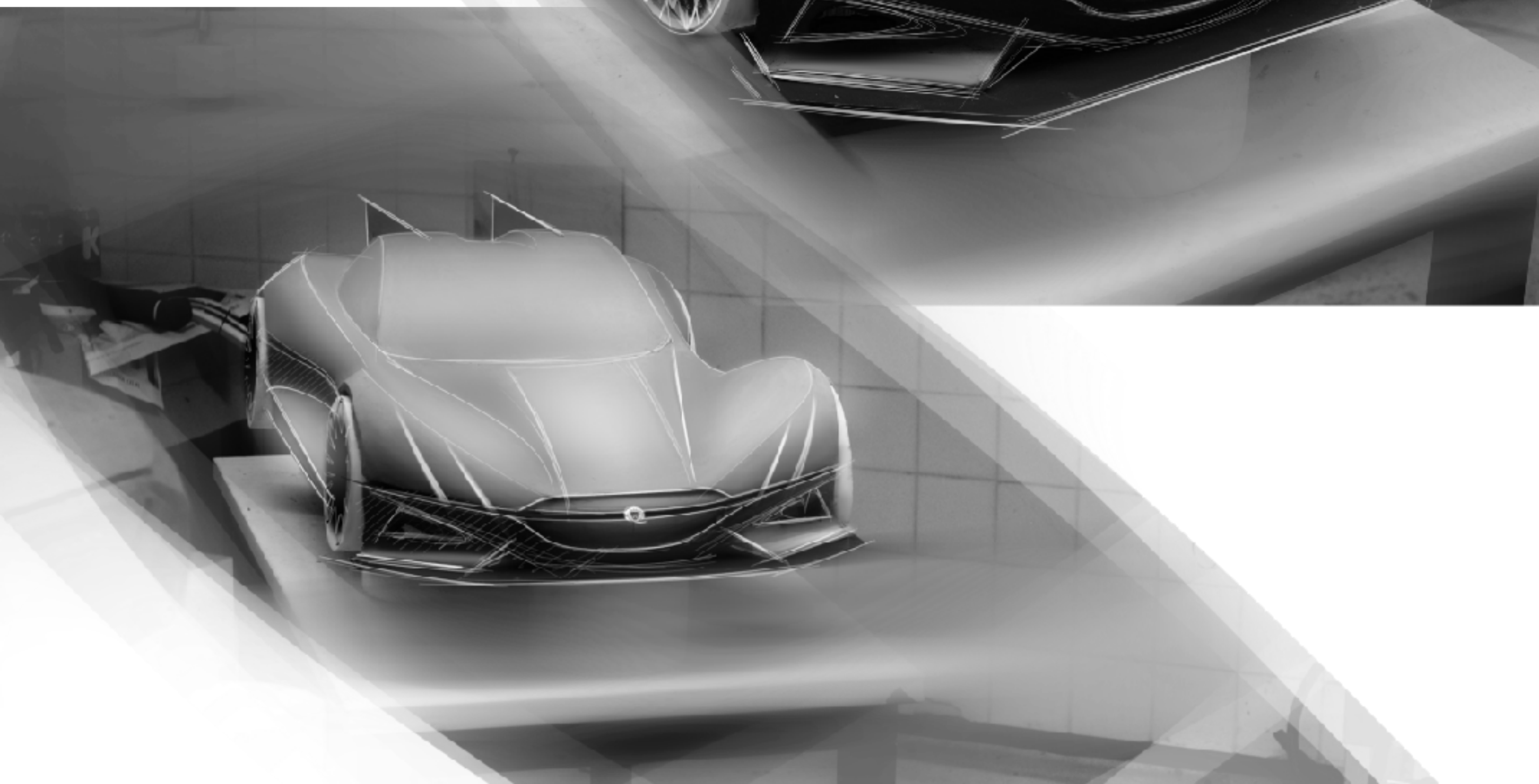
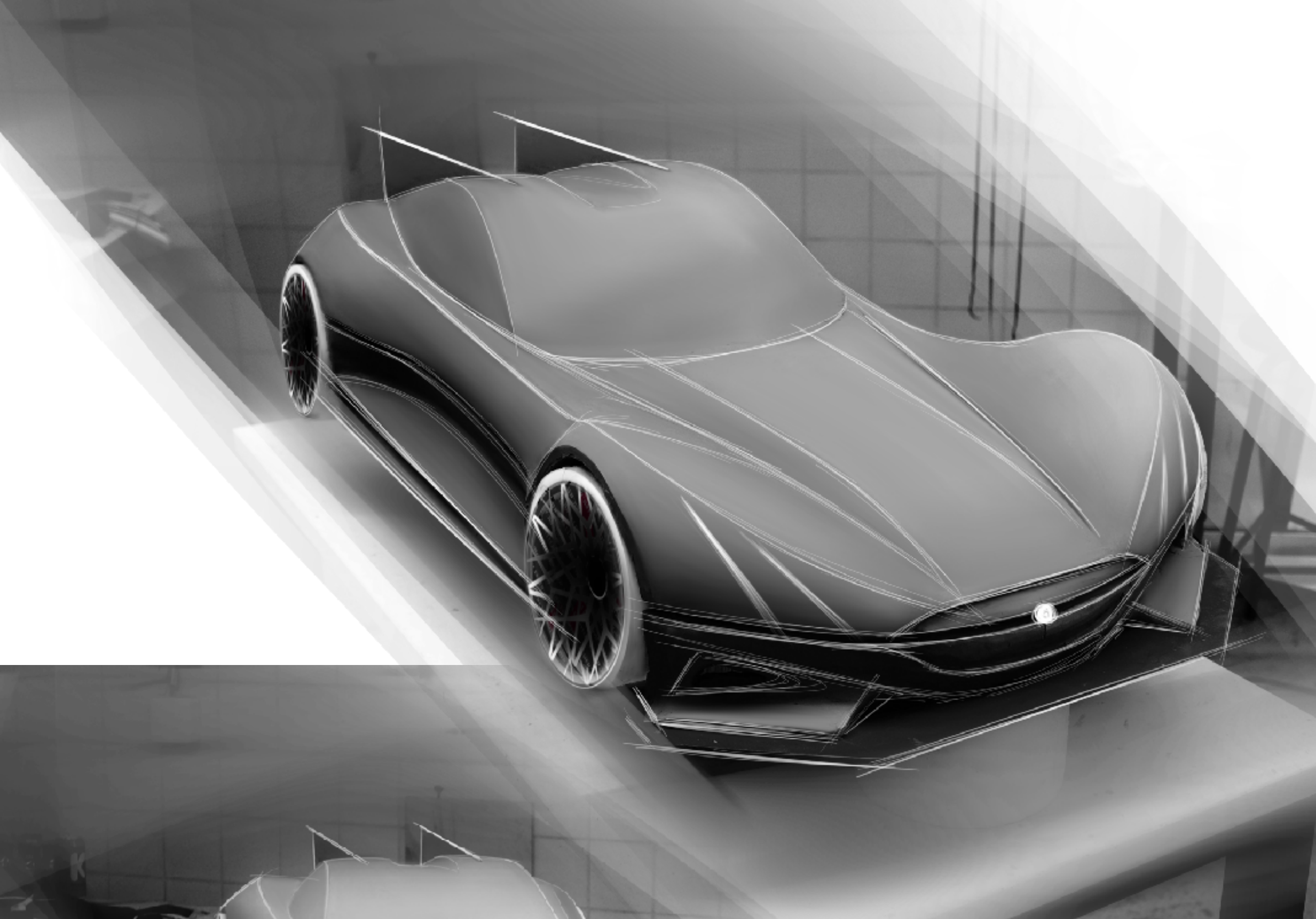
6.2

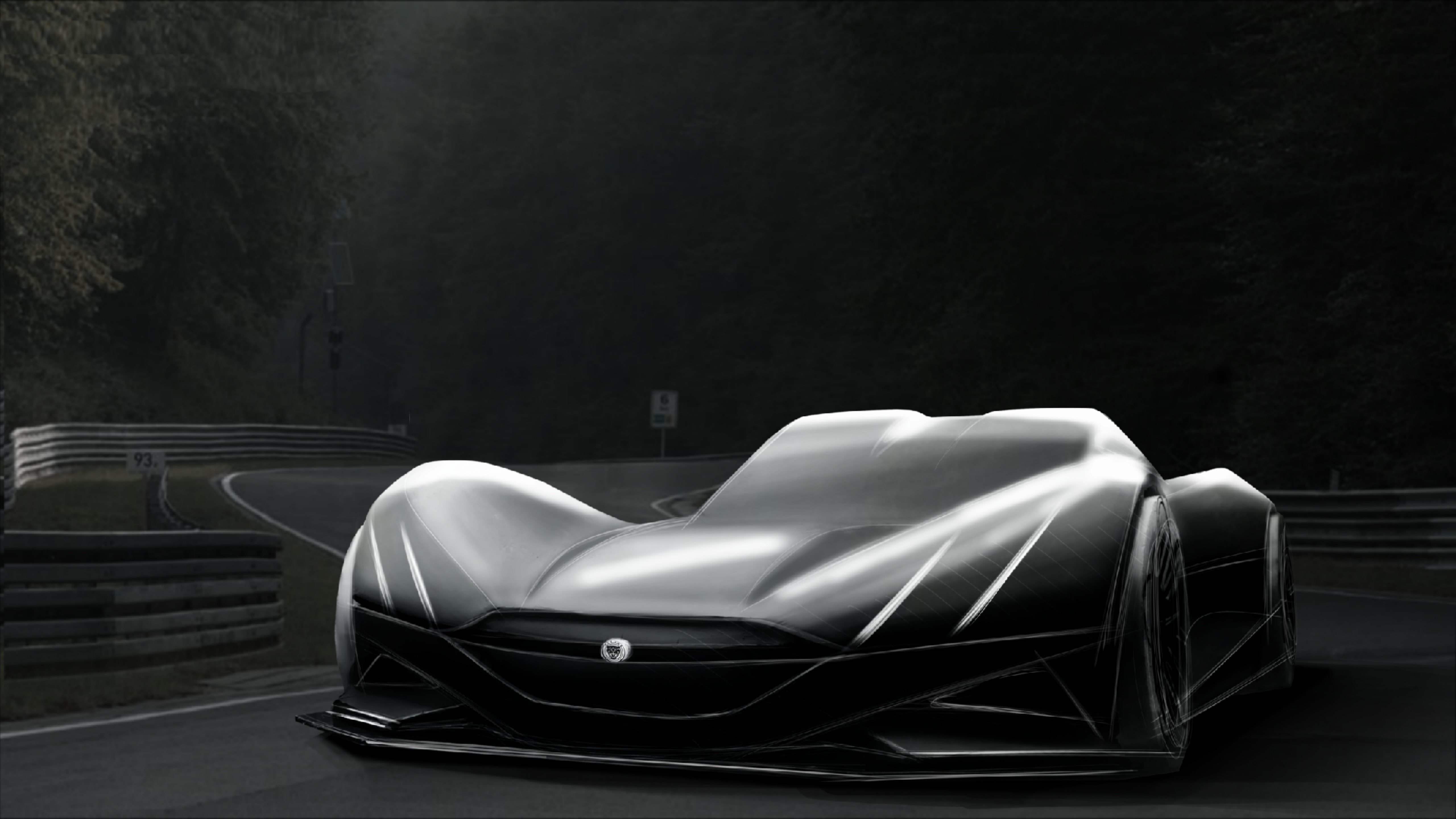
FINAL DESIGN



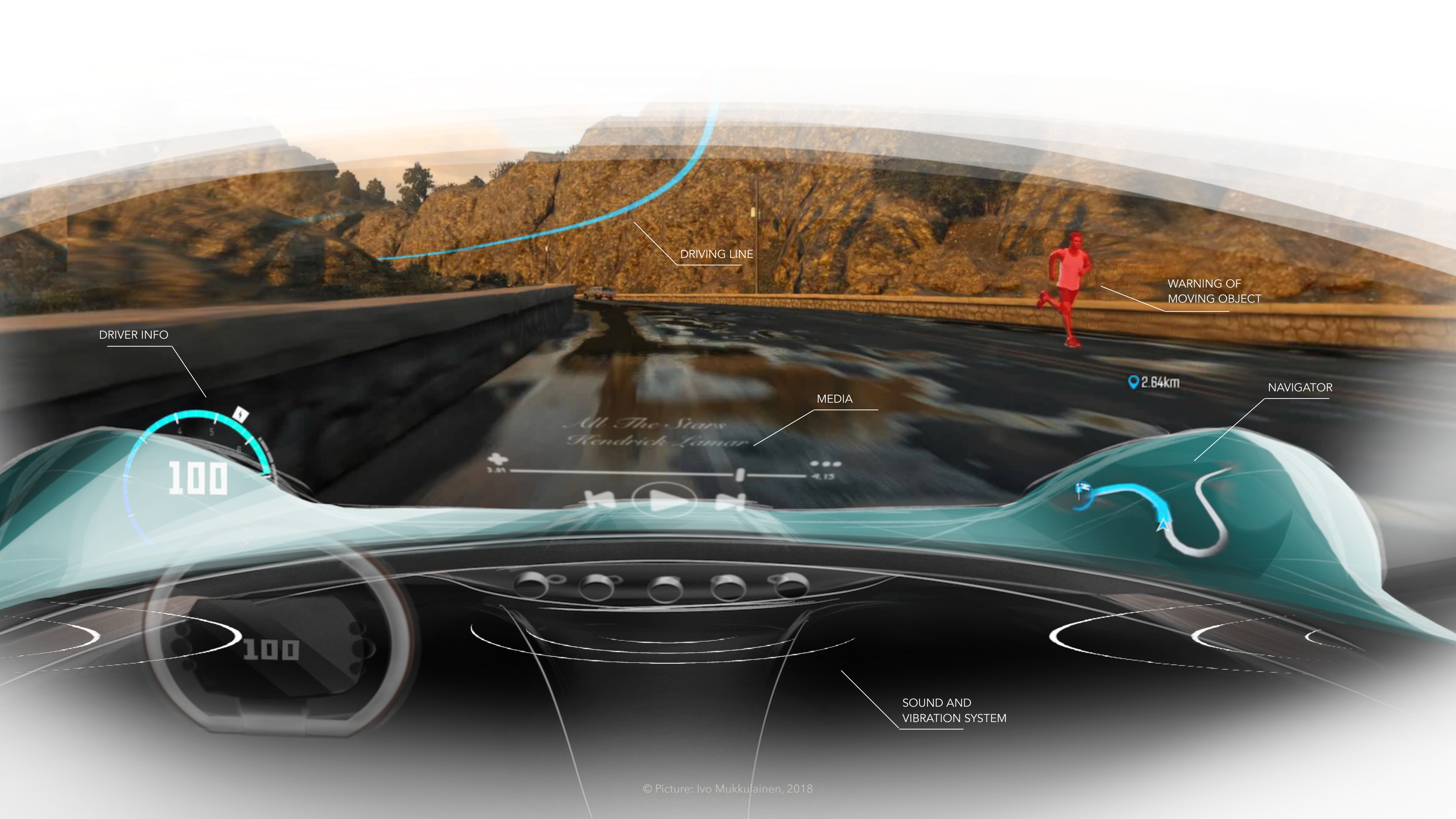












DRIVING LINE

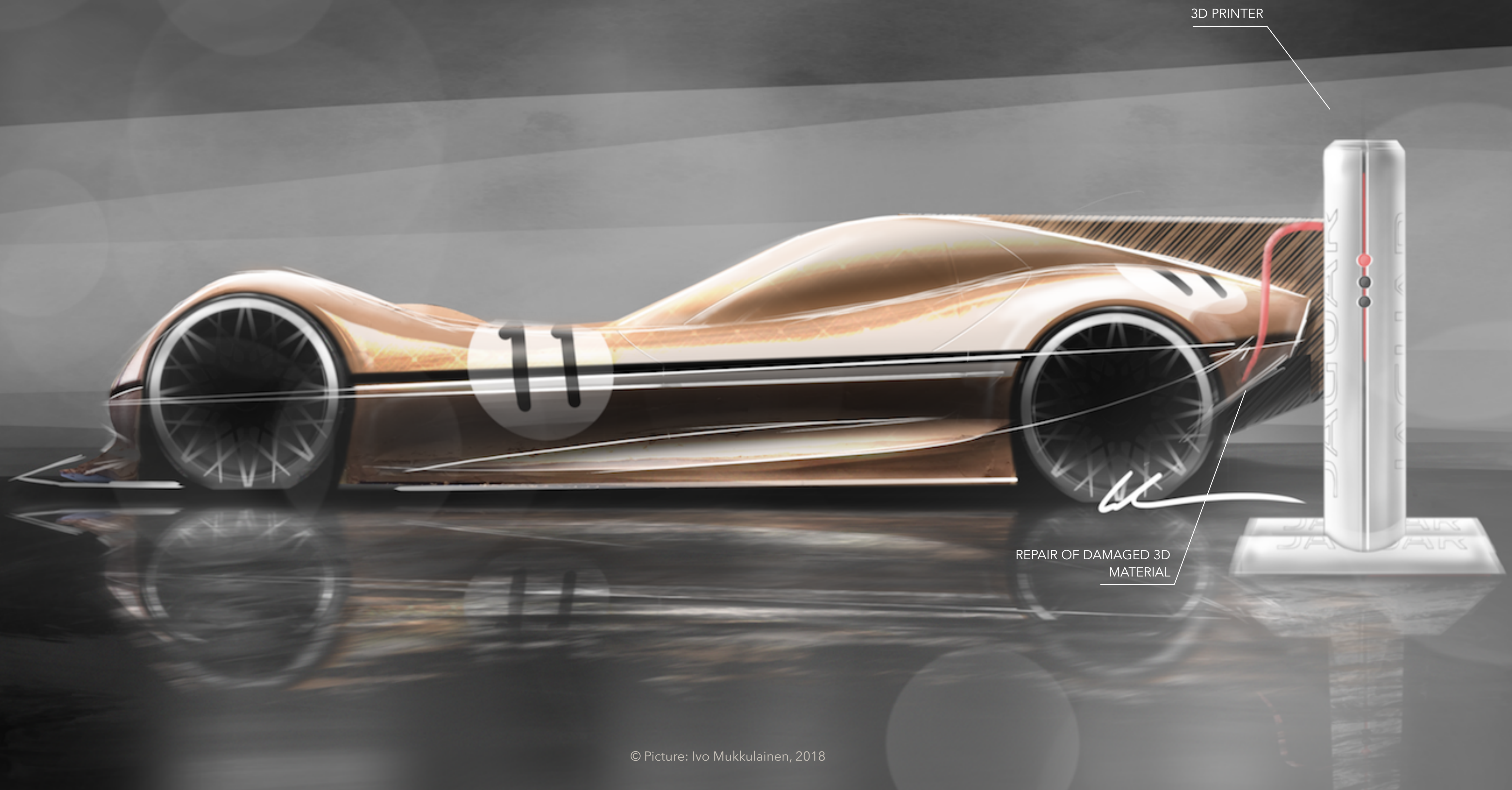
WARNING OF
MOVING OBJECT

DRIVER INFO

MEDIA

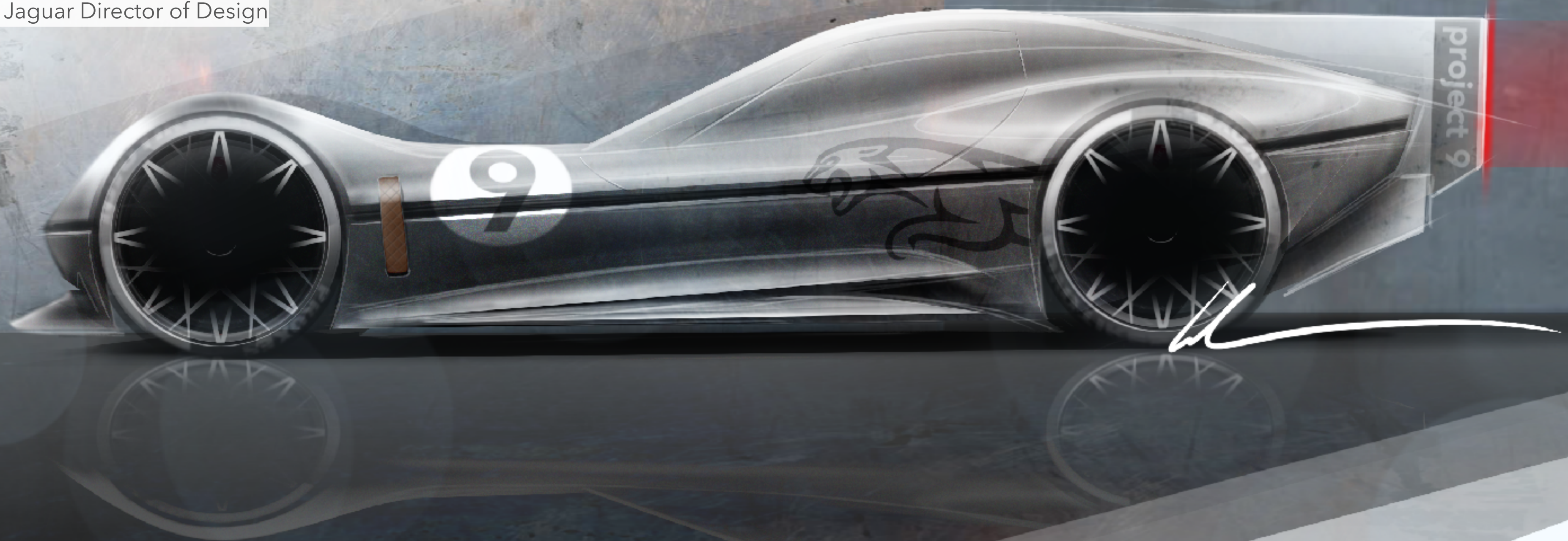
NAVIGATOR

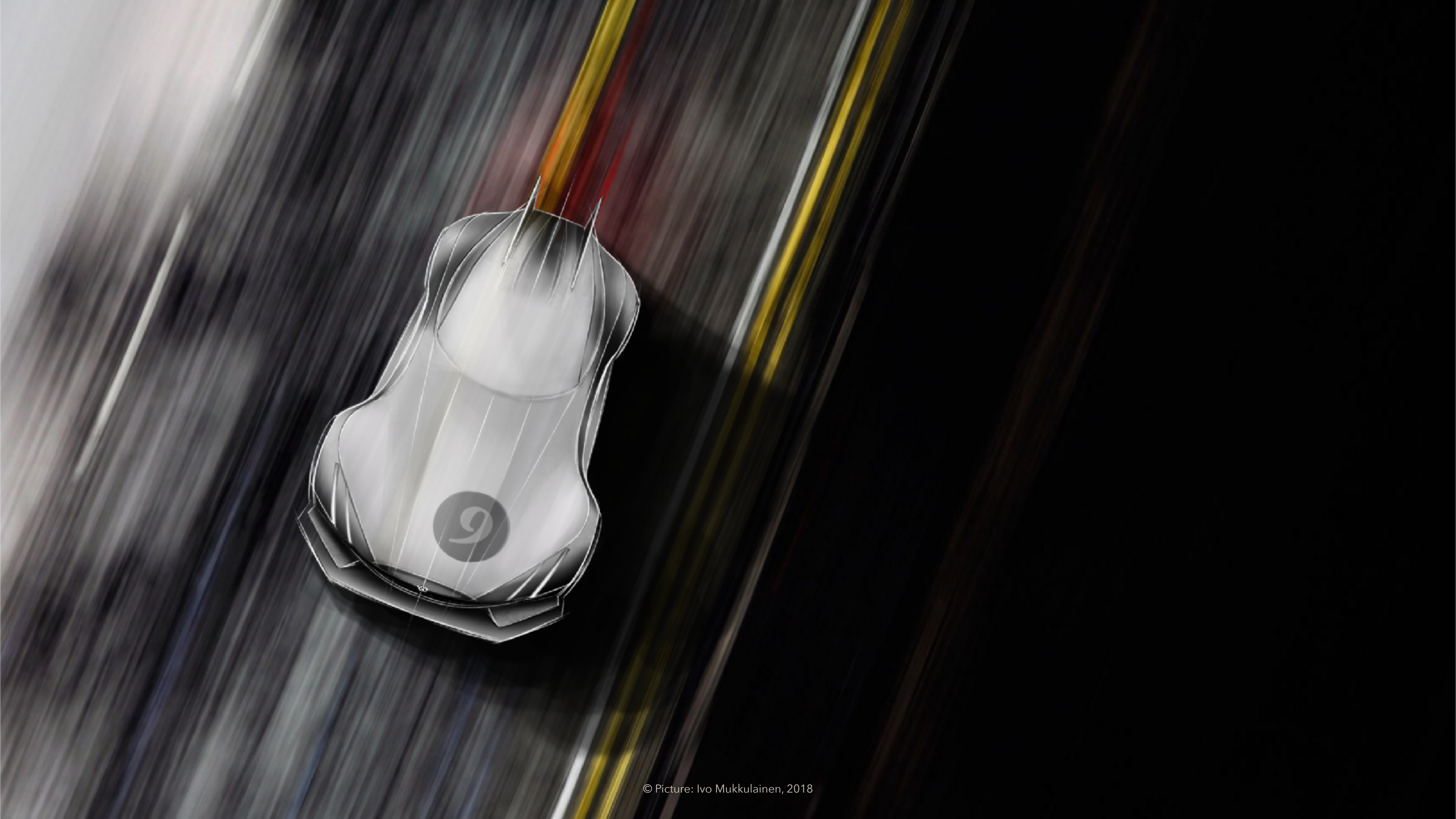
SOUND AND
VIBRATION SYSTEM



"It had to be instantly recognizable as Jaguar. It had to look fast, it had to look muscular and assertive. The proportions of stance had to be exciting but above all else, it had to look like drivers car, a Jaguar. Great design should always tell a story."

-Ian Callum, Jaguar Director of Design







Next pictures added
after STANCE
exhibition day

© Picture: Ivo Mukkulainen, 2018





















7. EVALUATION

7.1 MY EVALUATION OF THIS PROJECT

The process of this graduation project has been long and challenging.

At the beginning I was little bit too hurry because of the Michelin Challenge which had deadline in the beginning of March. So I created idea and renders in just couple months, which means that my design for challenge was not created for 100 percent right. And I have not included clay model, which at the time I was just started to make.

The brand was easy to choose. When it comes to elegance and classics, the Jaguar suits there well. I always loved Jaguar's design language and I also wanted to learn more about their brand and their history.

I like the technology. I always following of the latest technology and how the future technology is going to look. So this part was easy to choose. In this project, I have chosen the technology which suits there well and need to be part of the future cars.

The research and the ideation part of this project worked fluently to the point when I start to make the final design on the clay model. With the clay model was easy to see, will design work or not, unlike on the paper or on the screen. At this point, I took pictures of the clay model. On the top of pictures I did better designs. And make the new design on the clay model again. This circle way helped me to get the best result which I wanted to create. The hardest part of the clay model was the lower part of the rear part.

The hardest part was a written work of this project. I have chosen to write in the English language for becoming more better at it, learn more about it and for a better possibility of reading for my teacher.

This was one of the greatest experiences of the whole studying time. This project has not been so easy and I was not always so excited but I'm glad of what I have been going through and how much I have been learned. The clay model was the largest and coolest part of this project.

7.2

ACKNOWLEDGEMENTS

Thanks to my opponent Jaakko Järvinen for your ideas, for your help and being part of this project. Thanks to my teacher Lee Walton who helped me through this difficult and long journey. Thanks to Kaj Erik Kytönen, AirShaper, my sisters, everyone who was part of the Facebook research and everyone who helped me going by wishing me good luck.



SOURCES

© Picture: JonErlien.myportfolio.com, 2018

TEXT

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<https://www.michelinchallengedesign.com/18th-michelin-challenge-design/how-to-enter/>

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GRADUATION PROJECT

OBJECT SVO Project 9
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SCHOOL Lahti University of Applied Sciences, Institute of Design
MAJOR Vehicle Design
DATE Spring 2018